U.S. Department of the Interior
Bureau of Land Management

Owyhee Field Office Herd Management

DOI-BLM-ID-B030-2022-0008-EA

Owyhee Field Office
101 S. Bruneau Hwy, Marsing, ID 83639
May 2023

List of Acronyms Used in the Document

American Veterinary Medical Association	AVMA
Animal and Plant Health Inspection Service	APHIS
Appropriate Management Level	AML
Animal Unit Month	AUM
Approved Resource Management Plan Amendment	ARMPA
Area of Critical Environmental Concern	ACEC
Authorized Officer	AO
Bureau of Land Management	BLM
Capture, Treat, Release	CTR
Comprehensive Animal Welfare Program	CAWP
Cumulative Impact Analysis Area	CIAA
Code of Federal Regulations	CFR
Endangered Species Act	ESA
Environmental Assessment	EA
Environmental Impact Statement	EIS
Fenced Federal Range	FFR
Finding of No Significant Impact	FONSI
Federal Land Policy and Management Act	FLPMA
Government Accountability Office	GAO
Greater Sage Grouse	GRSG
Herd Management Area	HMA
Idaho Department of Environmental Quality	IDEQ
Idaho Department of Lands	IDL
Interdisciplinary Team	IDT
Integrated Pest Management	IPM
Instruction Memorandum	IM
National Academy of Science	NAS
National Environmental Policy Act	NEPA
Natural Resources Conservation Service	NRCS

Off High Vehicle	OHV
Off Range Corral	ORC
Off Range Pasture	ORP
Owyhee Resource Management Plan	ORMP
Population Growth Rate	PGR
Record of Decision	ROD
Required Design Features	RDF
Resource Management Plan	RMP
Season of Use	SOU
Standard Operating Procedures	SOP
Thriving Natural Ecological Balance	TNEB
United States Department of Interior	USDI
Wild Free-Roaming Horses and Burros Act	WFRHBA

1 Introduction

The Bureau of Land Management (BLM) Owyhee Field Office (OFO) is proposing a 10-year plan for the wild horse populations within the Black Mountain, Hardtrigger and Sands Basin Herd Management Areas (HMA) (Map 1, Appendix A). This would be accomplished through implementation of gathers, application of population growth suppression, and removal of excess horses from HMAs. The primary use of these actions would be to maintain the wild horse population within the Appropriate Management Level (AML) range and achieve a thriving natural ecological balance (TNEB).

Since the passage of the 1971 Wild Free-Roaming Horses and Burros Act (WFRHBA), Public Law 92-195, (as amended) management knowledge regarding wild horse population levels has increased. For example, it has been determined that wild horses are capable of increasing their numbers by 15% to 25% annually, resulting in the doubling of wild horse populations about every 4 years (NAS 2013). This has resulted in the BLM shifting program emphasis beyond just establishing AML and conducting wild horse gathers, to include a variety of management actions that further facilitate the achievement and maintenance of healthy and stable wild horse populations and a "thriving natural ecological balance." Management actions resulting from shifting program emphasis include implementation of population control measures such as fertility control, adjusting sex ratio and collecting genetic samples to assess genetic diversity. This also includes issuing ten-year plans which allow for incremental, and follow-up gathers as needed to implement population management, remove excess horses, and meet management objectives over time, with the overarching goal to reduce annual growth rates, maintain the herd within AML and ensure heathy wild horses and healthy rangelands in the long term.

If new information or circumstances arise during this 10-year period, the NEPA process would be used to identify any need for additional analyses. BLM's management to achieve a TNEB is not limited to removing excess animals; it also includes measures to reduce annual population growth and to allow for recovery of degraded vegetation and riparian areas impacted by wild horse overpopulation. These objectives require a sufficient time frame to achieve. While the BLM's plan is to promptly remove all excess animals above AML and include enough mare fertility control treatments to slow population growth, it is possible that a single gather would not achieve this because of limitations on gather efficiency (animals evading capture during gather operations), logistics (e.g. weather conditions, terrain, and large geographic area to be gathered), space capacity (for holding removed animals), or contractor availability that may constrain the number of gathers that can be conducted annually at the national level. Furthermore, not being able to successfully gather enough animals to implement population growth suppression could mean there would be a need to return with additional gathers, removals, and treatments in order to achieve and maintain the herds at AML.

For these reasons, a 10-year plan is needed to remove excess wild horses and bring the population down to the low-end of AML, implement population growth suppression measures over a sufficient period of time to reduce population growth measurably to reduce the number of excess animals that would need to be removed from the Black Mountain, Hardtrigger, and Sands Basin HMAs, and provide enough time for vegetative and riparian resources to recover and reestablish. Due to gather efficiency and aerial survey under estimation of existing population and population reproduction growth, it is anticipated that after the initial gather, there would be the need for at least one or more follow-up gathers in order to remove all excess animals above the low-end of AML and gathers would also be necessary over the course of the ten-year period to apply population growth suppression measures that would help reduce the overall population growth

rate. Since vegetative and riparian recovery occurs slowly, even after the immediate overpopulation has been addressed, management for a TNEB to allow for recovery of degraded resources would require maintaining the wild horse population within the AML and may require removal of animals above AML during the 10-year decision period to ensure range recovery.

This Environmental Analysis (EA) is a site-specific analysis of the potential impacts that could result from the implementation of the Proposed Action or alternatives. The analysis assists the OFO in project planning, ensuring compliance with the National Environmental Policy Act (NEPA), and in making a determination as to whether any "significant" impacts would result from the proposed actions. An EA provides analysis for determining whether to prepare an Environmental Impact Statement (EIS) or a statement of "Finding of No Significant Impact" (FONSI).

1.1 Background

The Owyhee Front in the Owyhee Field Office includes the Black Mountain, Hardtrigger, and Sands Basin HMAs. Sands Basin HMA is located approximately ten miles southwest of Marsing, Idaho in the Sands Basin Allotment (#00521). The Sands Basin HMA encompasses approximately 9,448 acres of public land, 886 acres of state land, and 1,381 acres of private land, for a total of 11,715 acres. Elevation in the Sands Basin HMA varies from approximately 4,000 ft. near Jump Creek to 5,500 ft. at the top of the ridges.

The Hardtrigger and Black Mountain HMAs are adjacent to each other. Hardtrigger HMA is located approximately five miles south of Marsing, Idaho in the Elephant Butte (#0513), Rats Nest (#0522), Reynolds Creek (#0508), Shares Basin (#0556) and Hardtrigger (#0516) allotments. Hardtrigger HMA encompasses approximately 60,061 acres of public land, 4,418 acres of state land, and 1,548 acres of private land, for a total of 66,063 acres. Black Mountain HMA is located approximately two miles southwest of Murphy, Idaho in the Hardtrigger (#0516), Rabbit Creek Peters Gulch (#0517), and East Reynolds Creek (#0651) allotments. Black Mountain HMA encompasses approximately 46,881 acres of public land, 2,550 acres of state land, and 1,180 acres of private land, for a total of 50,611 acres. Elevations in the Hardtrigger and Black Mountain HMAs vary from approximately 2,200 feet in the northern portion to 6,700 feet at Black Mountain.

Topographic features throughout all three HMAs are mostly rolling hills and flat plateaus within the Snake River Plains and high, steep, rugged ridges. The wide range in elevation and accessible terrain readily accommodates seasonal wild horse migration in the HMAs.

The AML range for wild horses in each of the HMAs was established through the 1999 Owyhee Resource Management Plan (RMP/ROD) (USDI 1999) (Table 1). AMLs were established for each of the HMAs based on monitoring data and public review. There is a similar dietary overlap between wild horses and livestock. Therefore, AUMs (Animal Unit Months) were allocated to wild horses on a proportional basis with other uses of the allotments (wildlife and livestock) using the best available utilization data collected within the allotments.

An AML is defined as the number of wild horses that can be sustained within a designated HMA to achieve and maintain a thriving natural ecological balance consistent with the multiple-use management concept for the area[1]. The AML lower limit is established at a level that allows the

[1] The Interior Board of Land Appeals (IBLA) defined the goal for managing wild horse (or burro) populations in a thriving natural ecological balance as follows: "As the court stated in Dahl v. Clark, supra at 594, the 'benchmark

population to reach the upper limit over a 4-to-5-year period at the annual population growth rate (approximately 18 percent per year) that would be typical if no fertility control measures were in place. Wild horse herd sizes have fluctuated in each of the HMAs since establishment in 1971 due to gathers when AML levels were exceeded or due to emergency conditions (drought or fire). After previous gathers, Black Mountain, Hardtrigger and Sands Basin HMAs were stocked at low or near low AML rates (30, 66 and 33 respectively). Horse population surveys have indicated that herd sizes were as high as 128, 295 and 122 in each respective HMA (Table 3). Since 2000, gathers have occurred in the HMAs 15 times (Table 4) with the most recent gathers completed in 2015 and 2016 as a result of the Soda Fire that burned the entire Hardtrigger and Sands Basin HMAs and over 30 percent of the Black Mountain HMA. Population inventories are generally completed every two-three years in the HMAs by double count aerial surveys or infrared surveys. The HMAs were most recently surveyed in May 2022 by the infrared method (Owyhee Air Research 2022). In those flights, a fixed wing aircraft was flown at elevations of approximately 2500 feet above ground level, with transect spacing of approximately one-third mile. A technician used a high-resolution infrared camera on the aircraft to scan for 'hot-spots' indicative of large animals; a visual spectrum camera was also used to record individuals and confirm group sizes. Under those conditions, the probability of detecting horse groups in open habitats is expected to be very high (Schoenecker et al. 2018), such that the estimates from the survey are likely to be very close to the true numbers of animals in the surveyed areas, at the time of survey.

An AML range was established for each HMA in the Owyhee RMP for several reasons. Resource degradation would likely occur when wild horse population levels exceed the upper range of AML. Periodic gathers would be required to maintain the wild horse population at the maximum AML if a range were not established. This would require either removing the annual increase in population each year or gathering less frequently and removing larger numbers. An AML range allows flexibility to gather to a lower number and be able to allow the herd to build over time to the higher number. Horses would be within the AML range for a longer period of time and would not need to be disturbed any more than necessary.

Table 1. Wild Horse Forage Allocations, AML Range, and Estimated Populations

Herd Management Area	Allocation (AUM)	AML Range	*Est. Population
Black Mountain	540	30-60	104
Hardtrigger	1,176	66 – 130	101
Sands Basin	588	33-64	65

* Estimated wild horse population on HMAs prior to the 2023 foaling season.

1.2 Purpose and Need for the Action

The purpose of the Proposed Action is to gather, utilize population growth suppression and remove excess wild horses from within and outside the Black Mountain, Hardtrigger, and Sands Basin HMAs using a variety of available practices to achieve and maintain established AML ranges.

The need for the Proposed Action is to prevent undue or unnecessary degradation of the public lands associated with excess wild horses (above AML), where the health of a herd is at risk or if wild horses are established outside an HMA boundary and to reduce the wild horse population size

test' for determining the suitable number of wild horses on the public range is 'thriving ecological balance.' In the words of the conference committee which adopted this standard: 'The goal of WH&B management ***should be to maintain a thriving ecological balance between WH&B populations, wildlife, livestock and vegetation, and to protect the range from the deterioration associated with overpopulation of wild horses and burros.'" *Animal Protection Institute of America*, 109 IBLA 115, (1989).

and growth rate to achieve and maintain a thriving natural ecological balance and multiple use relationship on the public lands. These actions are consistent with the provisions of Section 1333 (a) of the Wild Free-Roaming Horses and Burros Act (WFRHBA) of 1971 (as amended) and the Owyhee RMP.

The EA follows the guidance provided in BLM IM No. 2019-004. This memorandum guides BLM offices to analyze various wild horse management actions to meet the Purpose of and Need for action and to analyze management actions over multiple years. The 10-year timeframe of this EA enables BLM to determine the effectiveness of the Proposed Action at successfully achieving and/or maintaining population levels within AML for these HMAs; a process at which the BLM is unlikely to be successful in a short time frame.

Factors such as weather, water availability, forage availability, animal behavior, and the administration of fertility control can all increase the amount of time needed to reach AML. The trapping and fertility control treatment application process, along with concomitant monitoring as noted in the EA, would continue up to 10 years. This time frame allows for enough trapping and fertility control treatments to determine and ensure that the herds would achieve and be maintained within AML.

1.3 Decision to be Made

Based on the analysis presented in this EA, the Authorized Officer (AO) will select an alternative that meets the purpose and need for the action[2]. The Owyhee Field Manager is the AO responsible for the decision regarding management of wild horses in the HMAs. The BLM's AO will determine when and what methods would be used to manage wild horse herds to achieve and maintain AML. The decision would affect wild horses within and adjacent to the Black Mountain, Hardtrigger and Sands Basin HMAs only. The BLM's authorized officer would not set or adjust AML, nor would it adjust livestock use in the respective allotments.

1.4 Land Use Plan Conformance

The Proposed Action is in conformance with the Owyhee Resource Management Plan (ORMP) as amended (1999, 2015) which sets the following guidance (USDI BLM, 1999):

Wild Horses

Page 21: Maintain wild and free-roaming horses in the Owyhee Wild Horse Herd Management Areas (HMAs) at appropriate management levels (AML) within a thriving natural ecological balance.

In 2015, the Idaho and Southwestern Montana Greater Sage-grouse Approved Resource Management Plan Amendment (ARMPA) amended the ORMP. An ARMPA Conformance Form was completed on August 13, 2022 (Appendix G), and ARMPA applicable required design features are included in the project design features.

[2] A Herd Management Area Plan (HMAP) is not a requirement or a prerequisite to remove excess wild horses or apply fertility control methods in wild horse management. Any gather considered in this EA is in conformance with 43 CFR 4700.0-6 (a) through (c). The Interior Board of Land Appeals (IBLA) has ruled "…that it is not necessary that BLM prepare an HMAP as a basis for ordering the removal of wild horses, so long as the record otherwise substantiates compliance with the statute. Indeed, 43 CFR 4710.3-1 does not require preparation of an HMAP as a prerequisite for a removal action. Thus, we are not persuaded that preparation of an HMAP must in all cases precede the removal of wild horses from an HMA/WHT and decline to order preparation of HMAP's." 109 IBLA 127.

- **WHB-1:** (pg. 2-26) Manage herd management areas (HMAs) in GRSG habitat within established AML ranges to achieve and maintain GRSG habitat objectives (Table 2-2).

- **WHB-3:** (pg. 2-26) Prioritize gathers and population growth suppression techniques in HMAs in GRSG habitat, unless removals are necessary in other areas to address higher priority environmental issues, including herd health impacts. Place higher priority on Herd Areas not allocated as HMAs and occupied by wild horses and burros in SFA followed by PHMA.

- **WHB 8:** (p. 2-26): When conducting NEPA analysis for wild horse and burro management activities, water developments, or other rangeland improvements for wild horses, address the direct and indirect impacts on GRSG populations and habitat. Implement any water developments or rangeland improvements using the criteria identified for domestic livestock.

1.5 Relationship to Statutes, Regulations, and Other Documents:

The proposed action has been designed to conform to Federal regulations, consultation requirements, and other authorities which direct and provide the framework and official guidance for management of BLM lands within the OFO. Furthermore, the proposed action is in conformance with the following:

- The Wild Free-Roaming Horse and Burro Act (WFRHBA) of 1971 Public Law 92-195, as amended.
- Section 302 (a) and (b) of the Federal Land Policy and Management Act (FLPMA) of 1976, and the Public Rangelands Improvement Act of 1978 (Pub. L. 95-514, Sec. 4).
- 43 CFR 4700 – Protection, Management, and Control of Wild Free-Roaming Horses and Burros.
- BLM Wild Horses and Burros Management Handbook, H-4700-1 (June 2010).

Refer to Appendix F for a full list of the relevant statutes, regulations, and plans.

1.6 Scoping and Issue Development

The interdisciplinary team (IDT) identified several issues through internal and external scoping, field review, and consideration of published and collected information regarding the HMA and its surrounding landscape. On May 11, 2022, BLM released a scoping information package on ePlanning.gov detailing the purpose and need for action, preliminary issues, and potential alternatives for action to the public for comment. BLM received feedback from 11 commenters with 82 unique comments during the 30-day scoping period. Incorporating stakeholder feedback, the OFO IDT identified the issues below for detailed analysis to inform the decision-maker of possible management outcomes.

Issues

Wild Horses:

- How would the alternatives affect wild horse populations?
- How would the alternatives affect wild horse behavior?

Upland Vegetation:

- What would be the effects of the alternatives on upland vegetation community composition?

Wetlands/Riparian Zone and Water Quality:
- How do the alternatives affect riparian habitat and water quality?

Livestock Grazing Management:
- What would be the effects of the alternatives on livestock grazing management and associated ranch operations?

Wildlife and Fisheries:
- What would be the effects of horse population levels and aerial and bait gather activities on migratory birds and greater sage-grouse?
- What would be the effects of horse population levels and aerial and bait gather activities on big game species (bighorn sheep, mule deer, and pronghorn antelope)?
- What would be the effects of the alternatives on fish, including special status species?

1.6.2 Issues Considered but Dismissed from Detailed Analysis
Several issues were identified and considered through internal and external scoping but dismissed from detailed analysis. Descriptions of these issues and their dismissal from analysis are found in Appendix B.

2 Description of the Alternatives

This section of the EA describes the Proposed Action and reasonable alternatives, including alternatives that were considered but eliminated from detailed analysis. Reasonable alternatives are technically and economically practical or feasible. The Proposed Action and alternatives represent a reasonable range to cover the full spectrum of alternatives which meet the purpose and need.

2.1 Alternative A – No Action
Under the no action alternative, no gathers, removal, or fertility treatments would occur at this time. Based upon current population counts in the HMAs (Table 3), wild horse numbers within the Black Mountain, Hardtrigger and Sands Basin HMAs would increase to approximately 308, 283 and 178 adult horses (Win Equus, Median Trial, Appendix I) by fall of 2034 well beyond the established high AML for each HMA. The OFO would be in violation of the WFRHBA by not addressing excess wild horses when they are determined to occur by the AO on the HMAs. Previous NEPA documents and gather approvals for these HMAs have disclosed and identified likely resource and animal health issues when wild horse numbers get to this level above AMLs ID-130-2000-EA-0017 and EA # ID-130-2007-EA-3428. Although the No Action Alternative does not comply with the WFRHBA of 1971, does not comply with the BLM's regulations implementing the WFRHBA of 1971, and does not meet the purpose and need for this action in this EA, it is included as a basis for comparison with the Proposed Action.

2.2 Alternative B – Proposed Action
The BLM would manage for healthy, genetically diverse, and stable wild horse populations within established AML in each of the HMAs through gathers, fertility control treatments, selective horse removals, and periodic introduction of fertile animals from other HMAs for genetic purposes. The BLM would utilize these management actions on an as needed basis, making fine-scale decisions about the numbers of animals to be gathered, treated with fertility control, and removed based on updated information collected through routine herd and habitat monitoring (identified below).

The BLM would use management practices individually or in combination to maintain wild horse numbers within the AML range in the Black Mountain, Hardtrigger, and Sands Basin HMAs. Implementation could begin in 2023 on HMAs approaching or exceeding AML, depending on available funding. BLM would apply these practices when populations are approaching or exceeding high AML, where the health of the herd is at risk (drought, fire) or if wild horses are outside the HMA boundary. Over the course of 10 years following an initial gather, management practices would occur to achieve the conditions described below:

- When removals are necessary, aim to reduce the population to the low end of the AML range in each HMA.
- Reduce population growth rate using currently available immunocontraceptive fertility control vaccine treatments.
- Maintain an approximately 50:50 male to female sex ratio within each of the HMAs.
- The horse population size in each HMA would be monitored frequently (approximately every 2-3 years) in accordance with BLM policy.
- Genetic monitoring: blood and or hair samples would be collected following gathers and/or trapping as directed by policy.
- Maintain adequate levels of genetic diversity, as measured by observed heterozygosity, on the Black Mountain, Hardtrigger, and Sands Basin HMAs, by releasing 1-2 young mares from one HMA approximately once every generation (about 10 years), into one of the other HMAs in a similar environment. Horses from different HMAs may be introduced if genetic diversity monitoring of the three HMAs indicates that additional genetic diversity would be needed to stay above identified heterozygosity thresholds (USDI BLM 2010).
- Wild horses outside the boundaries of HMAs (adjacent public lands) would also be removed on an as needed basis.

Alternative B Management Practices

The management practices are composed of three main components: gather methods, fertility control and selective removal. These management practices can be implemented individually or in combination based upon the desired conditions for the HMAs and the conditions identified by contemporaneous herd and habitat monitoring. All actions would follow the Wild Horse and Burro CAWP Standards for Wild Horse and Burro Gathers described in Permanent Instruction Memorandum PIM-2021-002 (Appendix J) and IM2022-044 Wild Horse and Burro Gather Planning, Scheduling, and Approval with attachments (Appendices K and L). Additionally, Fertility control vaccine treatment Standard Operating Procedures (SOPs) (Appendix C) and Required Design Features (RDFs) (Appendix D) would be followed.

2.2.1.1 Gather Methods

Gathering any wild animals into pens has the potential to cause impacts to individual animals. There is also the potential for impacts to individual horses during transportation, short-term holding and long-term holding that take place after a gather.

Drive Trapping Method

The Drive Trap Method would be utilized when the majority of the herd (>85 percent) needs to be gathered from an HMA. This would occur when the herd size in an HMA is approaching or is over high AML causing undue resource damage, or when the health of the herd is at risk and needs to be gathered (drought, fire).

Drive trapping involves the use of a helicopter to herd wild horses into a temporary corral. During drive trapping, one or more temporary corrals would be constructed to trap, sort, and load wild horses at designated locations labeled on Appendix A – Maps 2, 3 and 4. These sites were chosen based upon the suitability for trapping horses as well as accessibility for transportation of gathered horses from the HMA. If the BLM or contractor wants to use a site that is not identified on Appendix A – Map 2, 3 or 4, clearances for cultural, vegetation and wildlife would be conducted. The site would only be used after approval from staff specialists and AO and would be implemented in accordance with the RDFs described in Appendix D. The temporary corral location(s) would be determined based on the proximity to the horses at the time of operations. The corral would consist of a trap with two wings and multiple pens encompassing about 0.25 acres and would be disassembled after use.

A contractor would perform the gather activities in cooperation with the BLM. The contractor would be required to conduct all helicopter operations in a safe manner and in compliance with Federal Aviation Administration (FAA) regulations 14 CFR § 91.119, BLM IM No. 2015-051 and BLM IM No. 2013-058. The CAWP SOPs detailed in Appendix J would be implemented to ensure that the gather is conducted in a safe and humane manner, and to minimize potential impacts or injury to the wild horses.

Utilizing the topography, temporary corrals would be placed in areas with a high probability of horse access. This should assist with capturing wild horses residing nearby. Traps consist of a large catch pen with several connected holding corrals, jute-covered wings, and a loading chute. The jute-covered wings are made of fibrous material, not wire, to avoid injury to the horses. The wings form an alley way used to guide the horses into the trap. Trap locations can be changed during the gather to reduce the distance that the animals must travel. A helicopter is used to locate and herd wild horses to the trap location. The pilot uses a pressure and release system while guiding them to the trap site, allowing them to travel at their own pace. As the herd approaches the trap the pilot applies pressure and a 'Judas' horse is released guiding the wild horses into the trap. Once horses are gathered, they are removed from the trap by loading them onto a gooseneck or semi-trailer (single level straight deck) and transported to a temporary holding facility where they are sorted.

During helicopter drive-trapping operations, BLM would assure that an Animal and Plant Health Inspection Service (APHIS) veterinarian or contracted licensed veterinarian is on-site or on-call to examine animals and make recommendations to BLM for care and treatment of wild horses. BLM staff would be present on the gather at all times to observe animal condition, ensure humane treatment of wild horses, and ensure contract requirements are met.

Helicopter gathers on the Black Mountain, Hardtrigger and Sands Basin HMAs would typically require 3 to 4 days between the annual timeframe of July-March but could occur under emergency conditions at any time of the year. Under difficult conditions (weather, herd distribution), it could take up to 2 weeks to complete a gather. Helicopter staging areas, vehicles, and trailers parking would occur within previously disturbed areas (e.g., gravel pits or similar) within appropriate flight distance to the HMAs. These areas would be reviewed by staff specialists and AO prior to use.

Except in emergencies, BLM does not gather wild horses with a helicopter during the 4-month period between March 1 and June 30 that is associated with the vast majority of wild horse foaling.

Horseback Drive Trapping Method

Horseback Drive-Trapping Method would occur on a limited basis for specific activities. These activities include moving horses closer to bait sites during bait gathers, moving horses from outside

the HMA to within the boundaries of the HMA and removing wild horses from private land adjacent to the HMA.

Bait/Water Trapping Method

The Bait/Water Trapping Method could be implemented when less than 50 percent of the HMA herd is targeted for gathering and trapping could be used throughout the year as conditions warrant. Bait trapping involves setting up portable panels around a traditional water source (water trough), in an active wild horse area, or around a pre-set water or bait source. The portable panels would be set up to allow wild horses to go freely in and out of the corral until they have adjusted to it. When the wild horses fully adapt to the corral, it is fitted with a gate system. When actively trapping wild horses, the trap would be staffed or checked daily by either BLM personnel or authorized contractor staff. Horses would be either removed immediately or fed and watered for up to several days prior to transport to a holding facility. Existing roads would be used to access the trap sites. See Appendix J for specific details and standard operating procedures of a bait/water trap gather.

Bait trapping operations would be conducted as needed; and as conditions are conducive between normal helicopter-drive gather cycles. For example, one to three bait traps would be constructed annually in the winter when feed is less available and wild horses are most responsive to hay. This would allow the OFO to gather wild horses, removing the adoptable horses and treating the mares with temporary fertility control and releasing them back to the HMAs. Typically, about 30-40 percent of the wild horses within the HMAs are accessible during winter months when bait trapping is effective. These trapping methods would be used as tools to remove excess wild horses in areas where concentrations of wild horses are detrimental to habitat conditions or other resources within the HMAs, to selectively remove a portion of excess horses for placement into the adoption and sale program, or capture, treat, and release horses for application of fertility treatment. The bait/water trapping method could take anywhere from one week to several months depending on the number of horses to trap and weather conditions.

Holding, Transport, and Adoption Preparation

Wild horses removed from the range would be transported to the Boise Facility or other off-range corrals (ORC) or off-range pasture (ORP) in a goose-neck stock trailer or straight-deck semi-tractor trailer. Trucks and trailers used to haul wild horses would be inspected prior to use to ensure they can be safely transported. Wild horses would be segregated by age and sex when possible and loaded into separate compartments. Mares and their un-weaned foals may be shipped together. Transportation of recently captured wild horses is limited to a maximum of 10 hours. During transport, potential impacts to individual horses can include stress, slipping, falling, kicking, biting, or being stepped on by another animal. Unless wild horses are in extremely poor condition, it is rare for an animal to die during transport.

Upon arrival at the ORC, recently captured wild horses would be off-loaded by compartment and placed in holding pens where they would be provided good quality hay and water. Additional information on ORCs can be found in Appendix H. Most wild horses begin to eat and drink immediately and adjust rapidly to their new situation. At the short-term holding facility, a veterinarian would assess animal condition and provide recommendations to the BLM regarding care, treatment, and if necessary, euthanasia of recently captured horses. Any animals affected by a chronic or incurable disease, injury, lameness, or serious physical defect (such as severe tooth loss or wear, club foot, and other severe congenital abnormalities) would be humanely euthanized using methods acceptable to the American Veterinary Medical Association (AVMA; BLM IM-2021-007). Wild horses in very thin condition or animals with injuries would be sorted and placed

in hospital pens, fed separately and/or treated for their injuries. Similarly, some mares may lose their fetuses. Every effort is taken to help the mare make a quiet, low-stress transition to captivity and domestic feed to minimize the risk of miscarriage or death.

Horses identified for retention in the HMA and for fertility control treatment would be fed, cared for, and maintained in a temporary or permanent corral facility until the fertility control treatment could be implemented and then be released back into the HMA.

After the recently captured horses have transitioned to their new environment, they are prepared for adoption, sale, or transport to an ORC or ORP. Preparation involves freeze-marking the animals with a unique identification number, vaccination against common equine diseases, castration of stallions, and de-worming.

*2.2.1.2 **Fertility Control***

These are actions to limit the reproductive rate of the herd, thereby reducing the frequency that the herd would need to be captured and removed from the HMAs. For specific information on the use of contraception, see Appendices C and E. Only the currently available immunocontraceptive vaccines (PZP vaccines and GonaCon-Equine vaccine; see Appendix E) are being considered as applicable fertility control methods in this analysis. For catch-treat-hold-release applications, a fertility control vaccine would be injected to mares following gather operations, mares that have not been treated before may be held for several weeks in a temporary holding corral or ORC to allow for treatment with a booster dose, and then the treated mares would be returned to the HMA. All mares returned to HMA would receive fertility treatment. For darting applications, the fertility control would be injected through a dart that administers a dose of vaccine without requiring the animal to be handled.

The percentage of effectively contracepted mares in the herd could vary over time, depending on the number of mares that are treated in different years, the formulation of vaccine that is used and the expected duration of vaccine effectiveness (see Appendix E). After the initial gather, the BLM could use a population modeling software such as PopEquus (Folt et al. 2023) to help inform expectations about how many animals in future gathers or actions should be removed, or mares treated, in order to achieve herd management goals. Herd management projections and specific decisions about the number of mares to be treated in the future would be informed by the best available information at the time, based on the results of records of past treatments and on herd monitoring results. However, logistical constraints associated with gather scheduling (for vaccine hand-injection) and animal approachability (for dart-based vaccine treatments) are such that it is unlikely that the fraction of mares that are effectively contracepted in any given year would ever exceed 75%. Because of high foal and adult survival rates (Ransom et al. 2016), the likely result is that the herd would always have a positive growth rate over time.

a. Injection of gathered horses
    i. The mares gathered following a drive trap or bait/water trapping that are selected to be returned to the HMA would be injected using a syringe with a fertility control vaccine immediately after the gather, then a booster would be given 30-75 days after the initial treatment as identified in Appendix E, then returned to the HMA. It is possible that some mares gathered via bait/ water trapping could be treated with a vaccine via dart or spring-loaded jab-stick delivery methods while they are in a trap, to minimize handling.
b. Darting free-roaming horses

i. Darting involves one or two people following a herd or an individual horse or setting up a blind at a water source to wait for horses. When a target mare is in range, a remotely-delivered dart containing an approved fertility control vaccine as identified in Appendix E would inject the vaccine dose.
ii. Darting activities could occur at any time of the year. The application is targeted, so the disturbance to wildlife and the wild horses is negligible.

*2.2.1.3 **Horse Management After Gather***

Horses may be released back into the HMAs, enter the BLM adoption program, or enter an off-range corral (ORC). Removal criteria, treatment, and handling procedures after a gather at ORC's are described in Appendices H, K, and L.

a. Release – Captured horses may be released back into the HMAs, after a holding period at a BLM ORC or temporary holding corral close to the gather site, to maintain the population within the HMA. Horses to be released typically include healthy mares and/or stallions 7-10 or 20+ years of age. However, animals that exhibit exceptional characteristics may be chosen for release outside of the selective removal criteria (Appendices K and L) on a case-by-case basis. Weak, unhealthy, and unthrifty animals would not be selected for release back into the HMAs. Additional criteria for release in the HMAs include:
    i. Genetic Mixing: Maintain/increase genetic diversity (observed heterozygosity) on the Black Mountain, Hardtrigger, and Sands Basin HMAs, by releasing 1-2 young mares from one HMA at least once every generation (about 10 years), into one of the other HMAs in a similar environment. Horses from different HMAs may be introduced if genetic diversity monitoring of the three HMAs indicates that additional genetic diversity would be needed to stay above identified heterozygosity thresholds (USDI BLM 2010).
b. Adoption and Sale Program – To maximize adoption potential, younger horses would be removed before older ones and enter BLM's adoption and sale program, which would include holding at an ORC. Horses are adopted and taken to private facilities to be trained and used by adoptees. The BLM conducts site visits to ensure the needs of the wild horses are being met, and the horses are healthy. If adoptees opt to discontinue the adoption, the animals are returned to the BLM holding facilities for future adoptions. The BLM adoption would follow the process outlined in 43 CFR Subpart 4750.
c. Off Range Pasture – Gathered animals that have been removed as excess animals but have not been adopted or sold may enter an ORP where they would live in a pasture setting with abundant food and water.

2.3 Alternative C Removal without Fertility Control

Alternative C would follow the same actions proposed in Alternative B, except as relates to applying fertility vaccine treatments. None of the mares returned to the HMAs would have fertility treatments applied and no remote darting would occur. Compared to Alternative B, herd size would grow faster under Alternative C, requiring more frequent gathers and a greater number of horses removed from the HMAs over time (see Appendix I).

2.4 Alternatives Considered but Dismissed

Application of Fertility Control without any Removals

An alternative that relies on application of fertility control alone, without any removals, would include gather-based fertility control treatments by hand-injection, or dart-based fertility control applications. Either way, such an alternative would not meet the purpose and need and therefore

was eliminated from further consideration. It is not realistic to expect that a fertility control-only approach would lead to the wild horse populations being within the established AML range, and populations would continue to grow even further in excess of AML, allowing resource concerns to further escalate. Causing a wild horse herd to decline over time through the exclusive use of fertility control can require almost every mare to be effectively contracepted every year for a time period of more than a decade; this may be achievable on a small island (i.e., NPS 2008) but is extremely unlikely in HMAs with rugged topography and unapproachable animals. Wild horse herd sizes in the Black Mountain HMA and Sands Basin HMA were already above AML before the 2023 foaling season. Any fertility control vaccines that the BLM could use even in 2023 would not prevent fetuses from developing into foals. By the fall of 2023, wild horse herd size in the Hardtrigger HMA would be close to the high end of AML, and in the absence of any removals, foals born in 2024 would likely cause the herd to exceed AML by fall 2024. Additionally, excess wild horses existing outside of HMA boundaries would not be removed. Implementation of this alternative would result in increased gather and fertility control costs without achieving a thriving natural ecological balance or resource management objectives.

Adjust Sex Ratio

This alternative would adjust the sex ratio from 50:50 stud to mare ratio to 60:40 stud to mare ratio. Reducing the proportion of breeding females in a population, leads to fewer foals being born, relative to the total herd size. Sex ratio manipulation to a 60:40 sex ratio can be an effective form of population growth suppression, as it can temporarily reduce population growth rates from approximately 20 percent to approximately 15 percent (Bartholow, 2004). The AML is less than 150 in each of the HMAs analyzed here. BLM guidelines indicate that sex ratio adjustments that lead to approximately 60% males should only be considered on HMAs where AML is above 150 (USDI BLM Handbook H-4700-1, 2010). Even if the Black Mountain and Hardtrigger HMAs are managed as a complex, the low AML would be 96 wild horses. Therefore, this alternative was not analyzed in detail.

Increase AML

Under this alternative, the BLM would consider increasing the AML level. This alternative was not brought forward for detailed analysis because it would be inconsistent with the Purpose and Need, and the WFRHBA which directs the Secretary to immediately remove excess wild horses and to manage for multiple uses. AML values for these HMAs were determined in the Owyhee RMP. Wild horse numbers in excess of AML would result in insufficient water and forage within the HMA. An increase in wild horse AML is therefore unsustainable.

Remove or Reduce Domestic Livestock

Under this alternative, no wild horses would be removed from the HMA. Instead, livestock would be removed from the HMAs to provide adequate forage for excess wild horses. This alternative does not meet the purpose and need to manage wild horses within AML established in the Owyhee RMP. It is also inconsistent with the WFRHBA, which directs the Secretary to remove excess wild horses. Livestock grazing can only be reduced or eliminated if BLM follows regulations at 43 CFR Part 4100 (2005) and must be consistent with multiple use allocations set forth in the land-use plan. Such changes to livestock grazing cannot be made through a wild horse gather decision and are only possible if BLM first revises the land-use plans to allocate livestock forage to wild horses and to eliminate or reduce livestock grazing.

The BLM is required to manage wild horses and burros in a manner designed to achieve a thriving natural ecological balance between wild horse and burro populations, wildlife, domestic livestock, vegetation, and other uses. Information about the Congress' intent is found in the Senate

Conference Report (92-242) which accompanies the 1971 WFRHBA (Senate Bill 1116): "The principal goal of this legislation is to provide for the protection of the animals from man and not the single use management of areas for the benefit of wild free-roaming horses and burros. It is the intent of the committee that the wild free-roaming horses and burros be specifically incorporated as a component of the multiple-use plans governing the use of the public lands."

Furthermore, simply re-allocating livestock Animal Unit Months (AUMs) to increase the wild horse AMLs would not achieve a thriving natural ecological balance in these HMAs. Wild horses are unlike livestock which can be confined to specific pastures, limited to specific periods of use, and specific seasons-of-use so as to minimize impacts to vegetation during the critical growing season and to riparian zones during the summer months. Wild horses are present year-round and their impacts to rangeland resources cannot be controlled through establishment of a grazing system, such as for livestock. And, under this alternative, the wild horse population would continue to increase at approximately18 percent per year, causing damage to all affected resources. Thus, impacts from wild horses can only be addressed by limiting their numbers to a level that does not adversely impact rangeland resources and other multiple uses.

Designate the HMAs to be Managed Principally for Wild Horse Herds
HMAs are designated in the Owyhee RMP for the long-term management of wild horses. The Owyhee Field Office does not administer any designated Wild Horse or Burro Ranges, which under 43 C.F.R. 4710.3-2 are "to be managed principally, but not necessarily exclusively, for wild horse or burro herds." There are currently four designated Wild Horse or Burro Ranges in the western states. This alternative would involve no removal of wild horses and would instead address excess wild horse numbers through removal or reduction of livestock within the HMAs. This alternative would exchange use by livestock for use by wild horses. Because this alternative would mean converting the HMAs to wild horse Ranges and modifying the existing multiple use relationships established through the land-use planning process, it would first require an amendment to the RMP, which is outside the scope of this EA. This alternative was not brought forward for analysis because it is inconsistent with the Owyhee RMP and the WFRHBA, which directs the Secretary to immediately remove excess wild horses where necessary to ensure a thriving natural ecological balance and multiple use relationship. This alternative is also inconsistent with the BLM's multiple use management mission under FLPMA. Changes to, or the elimination of livestock grazing cannot be made through a wild horse gather decision. As a result, this alternative was not analyzed in detail.

3 Affected Environment and Environmental Consequences

This section provides a description of the general environmental setting and resources within that setting that could be affected by the Alternatives. In addition, this section presents an analysis of the direct, indirect, and cumulative environmental impacts likely to result from the implementation of the alternatives.

3.1 General Setting

The Black Mountain, Hardtrigger, and Sands Basin HMAs encompass 116,390 acres of land managed by BLM, 7,854 acres of State of Idaho land and 4,109 acres of private lands in northwest Owyhee County. Topographic features throughout all three HMAs are mostly rolling hills and flat plateaus within the Snake River Plains and high, steep, rugged ridges.

The climate of the region is semi-arid high desert typical of southern Idaho. This climate is

characterized by cold winters (below 32 degrees Fahrenheit) and hot dry summers (80 degrees Fahrenheit and above) which are affected by the Pacific Ocean maritime masses. Elevations, topography, and aspect result in high variability in microclimates throughout the HMAs. Precipitation averages range from 8 inches in the low elevation to 14 inches at higher elevation. Most of the precipitation comes as snow in winter months with episodic rain events other times of the year.

The HMAs are typified by multiple sagebrush communities (*Artemisia spp.*) with a variable understory. Many areas are dominated by an invasive annual grass understory, with a lesser component codominant with deep-rooted, cool season perennial grasses and the shallow-rooted perennial grass Sandberg's bluegrass. Both represent community shifts from reference where deep-rooted bunchgrasses would be the dominant understory component. Such species include bluebunch wheatgrass (*Pseudoroegneria spicata*), bottlebrush squirreltail (*Elymus elymoides*) and at higher elevations, Idaho fescue (*Festuca idahoensis*). Although these species exist across the HMAs, they are often a minor component and or lack vigor. Some of this can be attributed to the 2015 Soda Fire, and subsequent recovery efforts, however, these trends were observed before the fire. The Soda Fire burned a total of 279,144 acres in Owyhee (Idaho) and Malheur (Oregon) counties across multiple land ownerships (Appendix A Map 5). The Soda Fire burned nearly 100 percent of the Hardtrigger and Sands Basin HMAs and over 30 percent of the Black Mountain HMA.

Extensive restoration treatments (herbicide for annual grass control, perennial grass seeding, and shrub plantings) were initiated after the Soda Fire across this burned landscape including significant portions of the HMAs. The Soda ESR monitoring reports (USDI 2016-2020) provide a full summary of the actions and results of these treatments.

3.2 Analysis Assumptions

Impacts from each management action would be similar each time they are repeated. The numbers of horses gathered, removed, or treated may vary each time the management action is taken.

Table 2. Timeframes for Short- and Long-Term Cumulative Effects Analysis

Resource	Short-Term Definition and Rationale	Long-Term Definition and Rationale
Wild Horses	Seven days to two months per gather (depending on gather type), extending the life of the project. Most of these impacts would be short-lived and temporary in nature.	Ten years – Wild horse population is expected to continue to increase. The rate of increase would be dependent on the alternative chosen and would be lowest under the Proposed Action.
Vegetation	Short-term effects to vegetation are measurable or observable for up to 3 years from the action.	Long-term effects to vegetation remain measurable or observable 3 or more years from the action.
Livestock	Seven days to two months per gather (depending on gather type), extending the life of the project.	Ten years – Long term impacts to livestock grazing would generally be absent and isolated to multiple short term impact periods repeated several times throughout the 10-year period of the project.

Wildlife	Short-term and direct impacts from gather activities would occur to vegetation and individual wild animals with effects persisting from 2-4 years.	Long-term and indirect impacts from wild horse population levels would occur to wildlife habitat quality and wildlife populations with effects persisting 5 or more years.

Past, Present and Reasonably Foreseeable Future Actions (RFFAs) Common to All Resources for Cumulative Effects Analysis

BLM Permitted Grazing and Trailing

BLM permitted grazing and trailing has occurred and would continue to occur for the foreseeable future. Within the next ten years, permits within the HMA (Table 6) may go through the grazing permit renewal process (separate NEPA action) that could result in the adjustment of livestock grazing management to make significant progress towards or meet the Idaho Standards of Rangeland Health (ISRH). Although future outcomes cannot be presumed, it is likely that grazing would continue to occur across the HMAs as part of BLM's multiuse mandate and would be managed with the objective to make significant progress towards or continue to meet the ISRH. Range improvements in these allotments may be maintained, enhanced, or newly developed.

Other Agency Grazing Permits

The Idaho Department of Lands permits grazing on State parcels within and surrounding the HMAs. Management of these permits are likely to continue under current management.

2015 Soda Wildfire: The Soda Fire ignited on August 10, 2015, approximately eight miles northeast of Jordan Valley, Oregon. The fire burned a total of 279,144 acres in Owyhee (Idaho) and Malheur (Oregon) counties and across multiple land ownerships (Appendix A, Map 5). The Soda Fire was contained on August 23, 2015. All three HMAs in addition to surrounding areas burned in the Soda Fire and were part of a greater fire recovery effort which included seeding, herbicide, and strategic shrub planting.

Soda Fire Fuel Breaks Project: The BLM Soda Fire Fuel Breaks Project (USDI BLM 2017b) is being implemented and entails managing vegetation (mowing, or disking and reseeding) within a 200-foot-wide buffer roadside fuel break treatment area (Appendix A, Map5).Roads identified for treatment extend into both Idaho and Oregon, affecting a total of 219 miles of roadside in Idaho, and 52 miles in Oregon. Treatments would be maintained and re-treated as needed into the foreseeable future. The treatment would also improve fire suppression capabilities, which would protect present vegetation across the allotment and allow post-fire vegetation treatments to establish and increase landscape resistance and resilience to possible future fires. The number of affected acres is contingent on the relevant cumulative impact analysis area (CIAA) by resource.

Invasive Annual Grass Management: BLM has ongoing chemical vegetation treatment within the Owyhee Field Office to address invasive annual grass expansion. Some of these treatments are being implemented as part of the Natural Resources Conservation Service (NRCS) Cheatgrass Challenge Program. Treatments consist of an application of imazapic, a BLM approved herbicide. Imazapic is a pre- and post-emergent herbicide that effectively targets annual grasses and broadleaf weeds, with minimal effect on perennial grasses. All standard operating procedures and mitigation measures from the Boise District BLM Noxious Weed and Invasive Plant Management EA DOI-BLM-ID-B0000-2016-0002-EA; tiered to the Vegetation Treatments Using Herbicides on Bureau of Land Management Lands in 17 Western States Programmatic Environmental Impact Statement

(USDI BLM 2007), and the Programmatic Vegetation Treatment EA DOI-BLM-ID-B0000-2016-0001-EA would be followed, as applicable.

Recreation: Includes hunting, rockhounding, camping, motorized and non-motorized activities. Recreational uses are increasing and expanding throughout the area. As a result, the need for recreation planning has increased. Recreation planning allows land management agencies to work to balance the resource needs with the demand for a variety of recreation uses which the public can enjoy within the public lands both inside and outside of the HMAs.

3.3 Wild Horses

- *How would the alternatives affect wild horse populations?*
- *How would the alternatives affect wild horse behavior?*

Affected Environment

Wild horses in the HMAs are descendants of domestic horses that were released into the wild in the 1800s and early 1900s. For many years, residents captured the wild horses and bred them with a variety of private stock. Wild horses in the HMAs represent a variety of colors and coat patterns, including grey, bay, sorrel, black, appaloosa, and pinto. Adult horses in the HMAs weigh an average of 1,000 pounds and stand between 14 and 15.5 hands, with some individuals standing 16 hands and weighing over 1,200 pounds.

Wild horses in these HMAs generally have a long lifespan (20 to 30 years), adapt well to a variety of habitats, and have few natural predators. The population growth rate (PGR) based on 20 years of counts in these HMA has been between 16 percent and 28 percent per year.

The HMAs were established in 1971 with the designation of the Wild Horse and Burro Act. The HMAs are fenced pastures that include numerous grazing allotments where cattle and wild horses graze. Numerous roads and trails cross these HMAs. Fence failure and gates left open by the public often allows wild horses outside of the HMAs.

The BLM established high and low AML ranges for Black Mountain, Hardtrigger, and Sands Basin HMAs through the 1999 Owyhee RMP (USDI 1999). The lower AML limit was set at a level that allows the population to reach the upper limit over a 4-to-5-year period at the average annual population growth rate (estimated at 18 percent) without any management actions.

Since the establishment of the HMAs, the BLM has used a variety of techniques to manage wild horse populations. The most common method is removal of excess horses through helicopter-drive gathers. Other methods include bait/water trapping, horseback-drive trapping, and limited fertility control vaccines (e.g. PZP or GonaCon). Interest in adoptions has increased in recent years but cannot place all the animals removed from the range into private care. Therefore, horses removed from the range are often transported to holding facilities, where they are cared for until they are adopted, sold, or die. Currently, there are approximately 62,398 wild horses and burros in off-range holding, including in ORCs (approximately 21,413) and ORPs (39,215) nationwide (https://www.blm.gov/programs/wild-horse-and-burro/about-the-program/program-data).

Off-range holding of excess wild horses consumes over 60 percent of BLM's WH&B Program's annual budget (https://www.blm.gov/programs/wild-horse-and-burro/about-the-program/program-data). In response to rapidly increasing costs and public sentiment, the BLM has focused on other methods of population control, including the injection of contraceptives in mares, and adjusting male-female ratios to lower population growth rates. The most common equine

contraceptive used, PZP vaccine, is effective for one to two years depending on the formulation (ZonaStat-H or PZP-22) and must be re-applied to maintain effectiveness (see Appendix E). Similarly, male-female ratios may change over time. Thus, while contraceptive use and natural variation in or manipulation of the male-female ratio tends to reduce the reproductive rate, those do not preclude the need to periodically remove excess horses from the HMAs.

Population inventory surveys have been completed in the HMAs using a variety of methods. Simultaneous double observers from an airplane or helicopter have proven to be a reliable and efficient method for wild horse inventory in the HMAs (Griffin et al. 2020). Flights are generally conducted every 2-3 years as funding allows to compile statistics regarding production in herds. Most commonly, simultaneous double-observer aerial surveys were conducted using SOPs (Griffin et al. 2020) as recommended by BLM policy (USDI BLM 2010, IM 2010-057) and a National Academy of Science (NAS) review (NAS 2013). The use of high-resolution infrared technology and distance sampling (IR surveys) was utilized in 2022. Table 3 provides a summary of the population estimates from surveys and counts made during gathers.

Table 3. Summary of yearly population estimates by HMA.

Year	Black Mountain	Hardtrigger	Sands Basin
2000[1]	105	117	62
2000[2]	37	67	NA
2004[1]	91	139	50
2004[2]	42	66	34
2006	72	188	64
2007[1]	95	295	NA
2007[2]	28	74	NA
2009[1]	34	91	122
2009[2]	NA	NA	33
2010[1]	52	113	NA
2010[2]	48	93	NA
2012	55	142	75
2014	79	188	52
2015[3]	128	176	70
2016	40	NA	6
2018[4]	NA	NA	33
2019[5]	NA	66	N/A
2022[6]	88	77	51
2023[7]	104	101	65
[1] Pre-gather			
[2] After gather			
[3]Soda Fire, August 2015			
[4] Horses released into Sands Basin HMA			
[5] Horses released into Hardtrigger HMA			
[6] Infrared Survey May 6-11, 2022			

[7] Estimated prior to foaling season

Since 2000, the HMAs have been gathered five times due to emergency (drought or fire), eight times due to exceedance of AML, and twice in a capture, treat, release (CTR). Approximately 1,229 horses have been gathered and 778 horses were removed. Fertility treatments have been administered to 119 mares that were returned to the HMAs. Gathers took place most recently after the 2015 Soda Fire when 308 horses were gathered by drive trap and bait/water trap. The intent of these gathers were to collect all horses from the Hardtrigger and Sands Basin HMAs that had been completely burned and a significant portion of horses in Black Mountain HMA to allow the HMAs and surrounding lands to recover from the large wildfire. In 2018, 26 wild horses were returned to Sands Basin HMA including thirteen treated mares and in 2019, 45 wild horses including 19 treated mares were returned to Hardtrigger HMA. Table 4 provides a summary of gathered horses, horses removed and returned, and those treated with fertility treatments since 2000 in the Black Mountain, Hardtrigger and Sands Basin HMAs.

Blood samples were taken during the 2003 gather to create baseline data to establish the current level of genetic diversity for the HMAs. No unusual alleles were found in the herd (Cothran 2004). Although the genetic diversity, as measured by observed heterozygosity, was relatively low (Cothran 2004), these herds are closely related to horses in the other nearby BLM-managed herd in southwest Idaho (Four Mile HMA; Cothran 2004). His report states “These herds should be monitored closely due to the low variation and the low AML for each herd unit. If the herds are in contact and do exchange breeding individuals, this would help in the long-term maintenance of variation but not in increasing current variation levels due to the high similarity of the four herds. Introduction of a small number of individuals should be considered. A good strategy could be to introduce small numbers into each HMA preferably of unrelated individuals for each HMA (i.e., individuals introduced into Black Mountain be unrelated to those put into Sands Basin)” (Cothran 2004). After the 2004 report, horses from Idaho and other HMAs were introduced to improve the genetic variability of the herds. The genetic diversity was most recently analyzed through blood

Table 4. HMAs gather, removal, treatment and release

HMA	Year	Gathered	Removed	Mares Treated with Fertility Control	Horses Returned	Method of Gather	Reason
Black Mountain	2000	72	68	-	4	Helicopter Drive Trap	Above AML
Hardtrigger	2000	54	50	-	4	Helicopter Drive Trap	Above AML
Black Mountain	2004	71	49	14[1]	22	Helicopter Drive Trap	Above AML
Hardtrigger	2004	106	73	6[1]	33	Helicopter Drive Trap	Above AML
Sands Basin	2004	28	16	3[1]	12	Helicopter Drive Trap	Above AML
Black Mountain	2007	81	66	-	15	Helicopter Drive Trap	Above AML
Hardtrigger	2007	218	218	-	0	Helicopter Drive Trap	Above AML
Sands Basin	2009	102	69	5[1]	13	Helicopter Drive Trap	Above AML-
Black Mountain	2010	44	4	18[1]	40	Helicopter Drive Trap	CTR[3]
Hardtrigger	2010	105	20	37[1]	85	Helicopter Drive Trap	CTR[3]
Hardtrigger	2014	38	37	-	1	Bait/Water Trap	Drought
Black Mountain	2015	70	65	4[1]	4	Helicopter Drive Trap	Soda Fire
Hardtrigger	2015	176	176	-	-	Helicopter Drive Trap	Soda Fire
Sands Basin	2015	39	39	-	-	Helicopter Drive Trap	Soda Fire
Sands Basin	2016	25	25	0	-	Bait/Water Trap	Soda Fire
Sands Basin	2018	-	-	13[2]	26	-	Return
Hardtrigger	2019	-	-	19[2]	47	-	Return

[1] PZP

[2]GonaCon

[3] Capture, Treat, Release

samples collected during Black Mountain and Hardtrigger gathers in 2010 (Cothran 2011). Genetic monitoring that would take place during the course of the first gather under Alternatives B or C would provide more recent information about specific levels of observed heterozygosity in these herds, but the relatively high collective herd sizes, and the introduction of animals from other herds since 2003 strongly suggests that heterozygosity levels are expected to be adequate (USDI BLM 2010) at this time.

The 2013 National Academies of Sciences report (NAS 2013) included additional evidence that shows that the HMA herds are not genetically unusual, with respect to other wild horse herds, and that supports the interpretation that the Black Mountain, Hardtrigger, and Sands Basin horses are components in a highly connected metapopulation that includes horse herds in many other HMAs. Specifically, Appendix F of the 2013 NAS report is a table showing the estimated 'fixation index' (Fst) values between 183 pairs of samples from wild horse herds. Fst is a measure of genetic differentiation, in this case as estimated by the pattern of microsatellite allelic diversity analyzed by Dr. Cothran's laboratory. Low values of Fst indicate that a given pair of sampled herds has a shared genetic background. The lower the Fst value, the more genetically similar are the two sampled herds. Values of Fst under approximately 0.05 or lower indicate virtually no differentiation, values of 0.10 or lower indicate very little differentiation, and only if values are above about 0.15 are any two sampled subpopulations considered to have evidence of elevated differentiation (Frankham et al 2010). Fst values for samples from the four Idaho HMAs (results from Black Mountain, Fourmile, Hardtrigger, and Sands Basin HMAs are shown collectively as "Idaho, ID" in the NAS 2013 table) had pairwise Fst values that were less than 0.05 with 36 other sets of genetic samples (including from herds in California, Colorado, New Mexico, Nevada, Oregon, Utah, and Wyoming), which indicates an extreme genetic similarity to a fairly large number of other BLM-managed herds.

Environmental Consequences

Impacts to wild horses would occur on either the individual or population level. A general review of the scientific literature related to wild horse interactions with their environment is included in Appendix E. Direct impacts include stress or injuries associated with gathering, sorting, and handling of animals. Indirect impacts include changes in herd dynamics or population numbers.

Population Modeling Summary

The Wild Horse Population Model (WinEquus version 1.40) developed by Dr. Steve Jenkins at the University of Nevada at Reno, was designed to assist Wild Horse and Burro Specialists in modeling various management options and projecting possible outcomes for management of wild horses. This model was used to estimate the population growth and size of herds over a 10-year period based upon current populations in each of the HMAs, consistent with BLM IM 2009-090; although the PopEquus model (Folt et al. 2023) is also available, the BLM does not have clear policy guidelines on its use at this time. Additional information concerning population modeling and graphic and tabular results for each of the alternatives are displayed in detail in in Appendix I.

Population modeling with WinEquus was completed for the alternatives to analyze how the alternatives would affect wild horse populations. Modeling evaluated Alternative A where current management would continue (no gathers, fertility control or population modification) Alternative B which would authorize gather operations, the use of fertility control and population modification and Alternative C which would authorize gathers, and population modifications only (no fertility treatments). The primary objective of modeling was to identify if the alternatives are likely to meet the purpose and need for the action, and to confirm that combinations of fertility control and

removals (Alternative B) are not likely to cause the herds to decline below desired levels.

3.3.1.1 Alternative A – No Action

Under this alternative, the risks to horses due to gathering, handling, and transport would be eliminated. Results from WinEquus for the No Action Alternative indicate that the HMA populations would grow at a median rate of 18 percent annually (over a 10-year period without gathers, removal or fertility treatments administered to wild horses in the HMAs). Based upon current population counts in the HMAs (Table 3), wild adult horse numbers would increase to 308 in Black Mountain HMA, 283 in Hardtrigger HMA and 178 in Sands Basin HMA (WinEquus, Median Trial, Appendix I) by fall of 2034 – these numbers are well beyond the established high AML for each HMA set in the ORMP.

The long-term health and sustainability of the wild horse population is dependent upon sustaining healthy rangelands. According to the Natural Resources Conservation Service, a horse typically consumes 3 percent of its normal body weight daily, for example, a 1,000-pound horse would consume 30 pounds of forage daily. Wild horses would die of starvation and lack of adequate available water as the population exceeded supportable levels. As populations increase beyond the capacity of the available habitat, more bands of horses would leave the boundaries of the HMA in search of forage and water. This alternative would result in increasing numbers of wild horses in areas not designated for their use, would be contrary to the WFRHBA and would not achieve the stated objectives for wild horse herd management areas, to "prevent the range from deterioration associated with overpopulation," and "preserve and maintain a thriving natural ecological balance and multiple use relationship in that area."

Though it may require many years for the population to reach catastrophic or self-limiting levels, the No Action Alternative poses the greatest risk to the long-term rangeland health of the Sands Basin, Hardtrigger, and Black Mountain HMAs. As per the National Research Council (NAS 2013, page 76), "It can be expected—on the basis of logic, experience, and modeling studies cited above—that because horses or burros left to "self-limit" will be food-limited, they will also have poorer body condition on the average. If animals are in poorer condition, mortality will be greater, particularly in times of food shortage resulting from drought or severe winter weather. Indeed, when population growth rate is zero, mortality must balance natality. Whether that is acceptable to managers, or the public is beyond the purview of the committee, but it is a biological reality." Taking no action would also be contrary to the WFRHBA, which requires the BLM to protect the range from the deterioration associated with overpopulation, remove excess animals from the range so as to achieve appropriate management levels, and to preserve and maintain a multiple-use relationship in that area.

3.3.1.2 Alternative B – Proposed Action

Gathers – General Effects

Impacts to wild horses would occur on either the individual or the population level. Direct impacts include stress or injuries associated with gathering, sorting, handling, and transportation of animals. Indirect impacts include changes in herd dynamics or population numbers.

The BLM has been conducting wild horse gathers across the western states since the mid 1970's. During this time, methods and procedures have been identified and refined to minimize stress and effects to wild horses during gather operations. The procedures outlined in the CAWP IM-2021-002 (Appendix J), and RDFs (Appendix D) would be implemented to ensure safe and humane

gathers, which would minimize potential stress and injury to wild horses.

In wild horse gathers that utilize helicopters, gather-related mortality for the BLM, averages about one half of one percent (0.5 percent), which is very low when handling wild animals according to the Government Accountability Office (GAO 2008). Another six-tenths of one percent (0.6 percent) of the captured animals were humanely euthanized in accordance with BLM policy (IM 2015-151) for pre-existing injuries or body condition (GAO 2008). The GAO report found that cumulative effects associated with the capture and removal of excess wild horses include gather-related mortality averaged only about 0.5% and approximately 0.7% of the captured animals, on average, are humanely euthanized due to pre-existing conditions (such as lameness or club feet) in accordance with BLM policy. Scasta (2020) found the same overall mortality rate (1.2%) for BLM WH&B gathers in 2010-2019, with a mortality rate of 0.25% caused directly by the gather, and a mortality rate of 0.94% attributable to euthanasia of animals with pre-existing conditions such as blindness or club-footedness. Scasta (2020) summarized mortality rates from 70 BLM WH&B gathers across nine states, from 2010-2019. Records for 28,821 horses and 2,005 burros came from helicopter and bait/water trapping. For wild burro bait / water trapping, mortality rates were 0.05% due to acute injury caused by the gather process, and death for burros with pre-existing conditions was 0.2% (Scasta 2020). For wild horse bait / water trapping, mortality rates were 0.3% due to acute injury, and the mortality rate due to pre-existing conditions was 1.4% (Scasta 2020). For wild horses gathered with the help of helicopters, mortality rates were only slightly lower than for bait / water trapping, with 0.3% due to acute causes, and 0.8% due to pre-existing conditions (Scasta 2020). Scasta (2020) noted that for other wildlife species capture operations, mortality rates above 2% are considered unacceptable and that, by that measure, BLM WH&B "…welfare is being optimized to a level acceptable across other animal handling disciplines." For comparison, of the 344 horses gathered during the 2015 Black Mountain, Hardtrigger and Sands Basin emergency gather, zero died of injuries sustained during the gather process. According to GAO (GAO 2008) and Scasta (2020), these data affirm that the use of helicopters and motorized vehicles has proven to be a safe, humane, effective, and practical means for gathers and removal of excess wild horses from the range.

Through the capture and sorting process, wild horses are examined for health, injury, and other defects. Decisions to humanely euthanize animals in field situations would be made in conformance with BLM policy. BLM Euthanasia Policy IM-2021-007 is used as a guide to determine if animals meet the criteria and should be euthanized. Animals that are euthanized for non-gather related reasons include those with old injuries (broken or deformed limbs) that cause lameness or prevent the animal from being able to maintain an acceptable body condition (greater than or equal to body condition score (BCS) 3), old animals that have serious dental abnormalities or severely worn teeth and are not expected to maintain an acceptable body condition, and wild horses that have serious physical defects such as club feet, severe limb deformities, or sway back. Some of these conditions have a causal genetic component and the animals should not be returned to the range to prevent suffering, as well as to avoid amplifying the incidence of the problem in the population. The BLM, except in case of emergency, avoids gathering wild horses by helicopter during March 1 through June 30 to reduce stress on heavily pregnant mares and newborn foals.

Both helicopter gathers and bait/water trapping can be stressful to wild horses. There is policy in place for gathers (both helicopter and bait) and subsequent transportation and off-range handling to enable efficient and successful gather operations while ensuring humane care and treatment of the animals gathered (CAWP IM 2021-002, Appendix J). This policy includes SOPs such as time of year and temperature ranges for helicopter gathers to reduce physical stress to the horses while being herded toward a trap; maximum distances to herd horses based on climatic conditions,

topography, and condition of horses; and handling procedures once the animals are in the trap. American Association of Equine Practitioners (AAEP 2011) was invited by the BLM to visit the BLM operations and facilities, spend time on WH&B gathers and evaluate the management of the wild equids. In their report (AAEP 2011), the task force concluded "that the care, handling and management practices utilized by the agency are appropriate for this population of horses and generally support the safety, health status and welfare of the animals."

In June 2010 BLM invited independent observers organized by American Horse Protection Association (AHPA) to observe BLM gathers and document their findings. AHPA engaged four independent credentialed professionals who are academia-based equine veterinarians or equine specialists. Each observer served on a team of two and was tasked specifically to observe the care and handling of the animals for a 3-4 day period during the gather process and submit their findings to AHPA. An Evaluation Checklist was provided to each of the observers that included four sections: Gather Activities; Horse Handling during Gather; Horse Description; and Temporary Holding Facility. The independent group visited 3 separate gather operations and found that "BLM and contractors are responsible and concerned about the welfare of the horses before, during and after the gather process" and that they were "gentle and knowledgeable, used acceptable methods for moving horses… demonstrated the ability to review, assess and adapt procedures to ensure the care and well-being of the animals" (Greene et al. 2013). A thorough review of gather practices and their effects on wild horses and burros can be found in a 2008 report from the GAO. The report found that the BLM had controls in place to help ensure the humane treatment of wild horses and burros (GAO 2008).

When injuries do occur, it is generally once the animal is in the confined space of the trap. When capture and handling of wild animals is required to achieve management objectives, it is the responsibility of the management professionals to plan and execute operations that minimize the animals' risks of injury and death; however, when capturing any type of large, wild animal one must expect a certain percentage of injury or death. Multiple studies in the wildlife research and management field have worked to improve understanding of the margins of safe capture and handling and have documented their findings of capture-related mortality. Delgiudice et al. (2005) reported 984 captures and recaptures of white-tailed deer (*Odocoileus virginianus*), primarily by Clover trap, under a wide range of winter weather conditions. Their results showed the incidence of capture accidents (e.g. trauma-induced paralysis or death) was 2.9 percent. This example shows how the capture of wild horses compares to the capture of other wild animals by number of incidences and how few wild horses are injured comparably.

Individual effects to wild horses include handling stress associated with the roundup, capture, sorting, handling, and transportation of the animals. The intensity of these effects varies by individual and is indicated by behaviors ranging from nervous agitation to physical distress. When being herded to trap site corrals by the helicopter, injuries sustained by wild horses may include bruises, scrapes, or cuts to feet, legs, face, or body from rocks and brush. Rarely, because of their experience with the locations of fences in the HMAs and placement of traps, wild horses encounter barbed wire fences and receive wire cuts. These injuries are treated onsite until a veterinarian can examine the animal and determine if additional treatment is required. Other injuries may occur after a horse has been captured and is within the trap site corral, temporary holding facility, during transport between facilities, or during sorting and handling.

These injuries are generally not fatal and are treated at the sorting/holding facility until a veterinarian can examine the animal. The AO would account for climatic and horse conditions when making gather decisions. This may include limiting the distance to traps and adjusting gather

times and seasons. To minimize potential for injuries from fighting, animals are transported from the trap site to the holding facility where stallions are sorted from mares and foals as quickly and safely as possible, then moved into large holding pens where they are provided with hay and water. On some gathers, due to the temperaments of the horses, they are not as calm, and injuries are more frequent.

Indirect individual effects are those that occur to individual wild horses after the initial event. These may include miscarriages in mares, transient social displacement, and conflict between dominant stallions. These effects, like direct individual effects, are known to occur intermittently during wild horse gather operations. An example of an indirect individual impact would be the brief 1- to 2-minute skirmish between older stallions that ends when one stallion retreats. Injuries typically involve a bite or kick with bruises that do not break the skin. Like direct individual effects, the frequency of these effects varies with the population and the individuals. Observations following capture indicate that miscarriage rates vary between 1 and 5 percent for captured mares. Mares in poor health or with very poor body condition are more likely to miscarry.

It is common for a small number of foals to be encountered in a gather during any month of the year. If newborn foals or foals too young to wean are gathered, they are matched with their mothers after being gathered. Fall and winter gathers are less stressful to foals than summer gathers due to their being older and more self-sufficient. Young foals in summer months may be more prone to dehydration and complications from heat stress. Additionally, handling, sorting, and transporting can be a stress to young animals, however, BLM staff on site take every precaution to assure that horses are handled and maintained to mitigate such impacts.

A few foals may be orphaned during a gather. This occurs if: the mare rejects the foal, the foal becomes separated from its mother and cannot be matched following sorting, the mare dies or must be humanely euthanized during the gather, the foal is ill or weak and needs immediate care that requires removal from the mother, or the mother does not produce enough milk to support the foal. On occasion, foals are gathered that were previously orphaned on the range (prior to the gather) because mothers rejected them or died. These foals are usually in poor condition. Every effort is made to provide appropriate care to orphan foals. Orphans encountered during gathers are cared for promptly and rarely die or have to be euthanized. Most foals gathered would be over four months of age and some would be ready for weaning from their mothers. In private industry, domestic horses are normally weaned between four and six months of age. Electrolyte solutions may be administered, or orphan foals may be fed milk replacer as needed to support their nutritional needs. Orphan foals may be placed in foster homes in order to receive additional care. Despite these efforts, some orphan foals may die or may be humanely euthanized as an act of mercy if the prognosis for survival is very poor.

Through the capture and sorting process, wild horses are examined for health, presence of injuries, and other defects. Decisions to humanely euthanize animals in field situations would be made in conformance with BLM policy. IM 2021-007 is used as a guide to determine if animals meet the criteria and should be humanely euthanized. Wild horses not captured may be temporarily disturbed and moved into another area during gather operations. With the exception of changes to herd demographics from removals, direct population effects have proven to be temporary in nature with most, if not all, effects disappearing within hours to several days of release. Hansen and Mosely (2000) monitored wild horse behaviors before and after a gather event, and compared the behavioral and reproductive outcomes for animals that were gathered by helicopter against those outcomes for animals that were not. This comparison led to the conclusion that gather activities used at that time had no effect on observed wild horse foraging or social behaviors, in terms of

time spent resting, feeding, vigilant, traveling, or engaged in agonistic encounters. Ashley and Holcomb (2001) did not find any statistically significant difference in foaling rates in the year after the gather in comparisons between horses that were captured, those that were chased by a helicopter but evaded capture, or those that were not chased by a helicopter. The authors concluded that the gathers had no deleterious effects on behavior or reproduction.

By maintaining wild horse population size within the AML ranges stipulated in the ORMP, there would be a lower density of wild horses across each HMA, reducing competition for resources and allowing wild horses to utilize their preferred habitat. Maintaining population size within the established AMLs would be expected to improve forage quantity and quality and promote healthy populations of wild horses in a TNEB and multiple-use relationship on the public lands in the area. Deterioration of the range associated with wild horse overpopulation would be avoided.

Managing wild horse populations in balance with available habitat and other multiple uses would lessen potential for individual animals or the herd to be affected by climatic fluctuations causing drought and reductions in available forage. Population management would lead to avoidance of or minimize the need for emergency gathers and increase success of the herd over the long term. In its 2013 report, the National Academy of Science (NAS), National Research Council concluded that "free-ranging horse populations are growing at high rates because their numbers are held below levels affected by food limitation and density dependence. Regularly removing horses holds population levels below food limited carrying capacity. Thus, population growth rate could be increased by removals through compensatory population growth from decreased competition for forage" (NAS 2013).

During the preparation process, potential effects to wild horses are similar to those that can occur during handling and transportation. Serious injuries and deaths from injuries during the preparation process can occur. From there, they would be made available for adoption or sale to qualified individuals or sent to ORPs. Implementation of management actions, the disposition of removed excess horses would follow existing or updated policies.

Potential effects to wild horses from transport to adoption, sale, or ORP are similar to those previously described. One difference is when shipping wild horses for adoption, sale, or ORP, animals may be transported for a maximum of 24 hours. Immediately prior to transportation, and after every 18 to 24 hours of transportation, animals are offloaded and provided a minimum of 8 hours on-the-ground rest. During the rest period, each animal is provided access to unlimited amounts of clean water and 25 pounds of good quality hay per horse with adequate bunk space to allow all animals to eat at one time. Most animals are not shipped more than 18 hours before they are rested. The rest period may be waived in situations where the travel time exceeds the 24- hour limit by just a few hours and stress of offloading and reloading is likely to be greater than the stress involved in the additional period of uninterrupted travel.

ORPs are designed to provide excess wild horses with humane, lifelong care in a natural setting off public rangelands. Wild horses are maintained in grassland pastures large enough to allow free-roaming behavior and with forage, water, and shelter necessary to sustain them in good condition.

Approximately 40,000 wild horses, in excess of the existing adoption or sale demand (because of age or other factors), are currently being held in ORPs. These animals are generally more than 10 years of age. Located in mid or tall grass prairie regions of the United States, these long-term holding pastures are highly productive grasslands as compared to more arid western rangelands. Generally, mares and castrated stallions (geldings) are segregated into separate pastures. No

reproduction occurs in the ORP, but foals born to pregnant mares are gathered and weaned when they reach about 8 to 10 months of age and are then shipped to ORCs like the Boise BLM ORC where they are made available for adoption.

Handling by humans is minimized to the extent possible in ORPs, although regular on-the ground observation and weekly counts of wild horses to ascertain their numbers, well-being, and safety are conducted. A very small percentage of the animals may be humanely euthanized if they are in underweight condition and are not expected to improve to a BCS of 3 or greater due to age or other factors. Natural mortality of wild horses in ORP's average approximately 8 percent per year but can be higher or lower depending on the average age of the horses' pastured (GAO 2008).

While humane euthanasia and sale without limitation of healthy horses for which there is no adoption demand is authorized under the WFRHBA, it has been restricted either by a moratorium instituted by the director of BLM or by the annual Congressional appropriations bill for the Department of the Interior in most years. The BLM does not engage in the destruction of healthy animals.

Impacts to wild horses would occur on both the individual level and on the population as a whole. Individual impacts include stress or potential injuries associated with gathering, sorting, and handling of animals. Population impacts include changes in herd dynamics or population numbers. Genetic monitoring that would take place would allow BLM to determine what the status of genetic variability is in the herd, and whether additional introductions would be necessary. To ensure safe and humane gathers, BLM would follow the procedures outlined in the CAWP established in IM-2021-002 (USDI BLM, 2021), which would minimize potential stress and injury to wild horses. This policy includes SOPs (Attachment 1 within the IM) such as time of year and temperature ranges for helicopter gathers to reduce physical stress to the horses while being herded toward a trap; maximum distances to herd horses based on climatic conditions, topography, and condition of horses; and handling procedures once the animals are in the trap.

Wild horses are usually very fit and in good health when not stressed by lack of food, water, and are able to endure the physical requirements of a gather. The environmental conditions and the overall health and well-being of the wild horses is continually monitored through both summer and winter gathers to adjust gather operations as necessary to protect the wild horses from gather-related health issues. For these reasons, flexibility in gather operations is an inherent part of all gathers. Individual effects to wild horses from gathers (drive trapping and bait/water trapping) include stress and potential physical injury. Stress is associated with the capture, handling, and transportation of the animals. The intensity of these effects varies by individual, behaviors range from nervous agitation to physical distress.

During a Gather

BLM staff would coordinate with the contractor or in-house BLM team completing the gather on a daily basis to determine animal locations in proximity to gather sites, and to discuss terrain, animal health, gather distances and other logistics to ensure animal health and safety. Injuries would be examined and treated by a veterinarian at the sorting/holding corrals, as needed. BLM staff would be on site at all times to observe the gather, monitor animal health, and coordinate the gather activities by in-house BLM gather teams or contractors. BLM staff, contractor, and crew are attentive to the needs of all wild horses captured during gathers to ensure their health and safety.

Temperature-related issues during a gather would be mitigated by adjusting daily gather times to

avoid the extreme hot or cold periods of the day. If forage or water is limiting, animals may need to travel long distances between water and forage and may become easily dehydrated. To minimize the potential for distress during summer gathers, capture operations would generally be limited to early morning hours in the summer months when temperatures are cooler. For drive trap gathers, the distance animals must travel to the trap is also shortened to minimize potential stress. The BLM and contractor would ensure there is plenty of clean water for the animals to drink once captured. A supply of electrolytes is kept on hand to apply to the drinking water if necessary. Electrolytes help to replace the body fluids that may be lost during capture and handling.

Drive Trapping Method

Helicopter pilots allow wild horses to travel at their own pace for most of the distance to the gather location. The pilots would hold all necessary certifications and credentials and have the specific experience needed to ensure excessive pressure is not imposed on wild horses until the horses enter the wings of the capture site. Additional pressure is required to move the horses safely into the capture site and prevent them from turning back or trying to disband at the last minute. This is to avoid the need to re-gather or to rope the horses from horseback, which could expose them to additional stress or injury. Foals separated during the gather process are safely grouped and transported to the sorting/holding facility to be reunited with their mothers. During the March 1 to June 30 period, the BLM does not gather wild horses with a helicopter unless it is an emergency. This four-month period between March 1 and June 30 is when a majority of foals are born (USDI-BLM, 2010).

Individual animals would experience physical and psychological stress for short periods during aerial gather operations. Heart rates would be elevated, especially during the final move into a capture site. However, animals would be moving at a walk/trot during most of the gather and would not be moving more than 8 to 10 miles, with the majority traveling 4 to 6 miles. While wild horses in the HMAs are habituated to low levels of human activity associated with recreation and livestock management, higher levels of disturbance related to gather operations could cause anxiety in individuals. Because all phases of the process would be carried out according to BLM policy, individual stress would be minimized. Animals would be expected to recover from stress within 24 hours of entering the capture site.

Bait Trapping

Bait trapping gathers would cause lower levels of stress and potential for injury to wild horses initially because horses have grown accustomed to the trap area as a food source. However, following either gather technique, the same types of effects to wild horses are anticipated and described in detail below.

After Capture

Other injuries may occur after a horse has been captured and is within the trap site corral or temporary holding facility, or during transport between facilities, or during sorting and handling. Injuries could be sustained by wild horses captured through any trapping method (drive trapping or bait/water trapping), as the animals need to be sorted, aged, transported, and otherwise handled following their capture; these injuries are usually a result of kicks and bites from other horses, or from collisions with corral panels or gates. These injuries are generally not fatal and are treated at the ORC.

Transportation of Wild Horses

Transportation of recently captured wild horses is limited to a maximum of 10 hours. During transport, potential effects to individual horses can include stress, as well as slipping, falling,

kicking, biting, or being stepped on by another animal. Unless wild horses are in extremely poor condition, it is rare for significant injury or death during transport. A small number of mares may be shipped with foals.

Indirect Effects of Gathers

Individual effects that occur to individual wild horses after the initial event may include miscarriages in mares, increased social displacement, orphaned foals, and conflict between dominant stallions (typically a brief skirmish that occurs among older stallions following sorting and release into the stud pen). These effects occur intermittently during wild horse gather operations. Observations following capture indicate the rate of miscarriage varies but can occur in about 1 to 5 percent of captured mares, particularly if the mares are in very poor body condition or health. Injuries between stallions typically involve a bite or kick with bruises that do not break the skin. Traumatic injuries usually do not result from these conflicts.

Wild Horses Remaining or Released into the HMA following Gathers

Except for changes to herd demographics, direct population-wide impacts from previous gathers have proven to be temporary in nature, and most if not all impacts to individual wild horses would recover within hours to several days of release based upon observations of horse herds following gathers in previous years (Table 4) in these HMAs. No observable effects associated with these impacts would be expected within one month of release except a heightened awareness of human presence. There is the potential for the horses that have been desensitized to vehicles and human activities to return to areas where they were gathered if released back into HMAs. Wild horses that are not captured may be temporarily disturbed and move into other areas during gather operations. The remaining wild horses not captured would be expected to maintain their social relations. Herd demographics (age and sex ratios) may shift slightly as a result of gathers and removals. The relatively small size of the HMAs allows wild horses to return to their home ranges easily, because they are familiar with the topography and water sources. No observable effects to the remaining population from the gather would be expected.

The National Selective Removal Criteria (Appendix M), which prioritizes removal of wild horses 6 years of age and under, would be followed to the extent possible, however it is expected that most released and non-gathered animals would consist of all age groups greater than 6 years of age.

By maintaining wild horse population size within the AMLs, there would be a lower density of wild horses across the HMAs, reducing competition for resources within the wild horse herd and with wildlife, allowing wild horses to utilize their preferred habitat. Maintaining population size within the established AMLs would be expected to maintain forage quantity and quality and promote healthy populations of wild horses in a thriving natural ecological balance and multiple-use relationship on the public lands in the area. Populations managed within AMLs would be more resilient to the effects of drought or hard winters compared to populations exceeding AMLs.

Population management would reduce the need for emergency gathers and increase stability and health of the herd over the long term. Maintenance of the population within AMLs would reduce resource conflicts and ensure the horses remain in better health than if their population were constrained by available forage.

Achieving the AML and improving the overall health and fitness of wild horses has the potential to increase foaling rates and foaling survival rates over current conditions, though this effect is expected to be more marginal in horses than in ungulates without a history of domestication,

because horse life history may already tend to maximize reproductive, rates regardless of forage quality (Boyce and McLoughlin 2021). The primary effects to the wild horse population that would be directly related to proposed gather and fertility control treatment activities would be to herd population dynamics, age structure or sex ratio, and subsequently reduced growth rates and population size over time.

In management activities that do not include returning any captured animals to the range, the effects of successive removals on populations causing shifts in herd demographics favoring younger horses (0 to 6 years) would also have direct effects on the population. However, these impacts are not generally thought of as adverse to a population. They include development of a population which is expected to be more biologically fit, more reproductively viable, and more capable of enduring stresses associated with traumatic natural and artificial events. Regardless, under Alternative B, some captured animals would be returned to the range, and this would be expected to mitigate any possible shift in age structure.

The genetic effective population size (Ne) is a measure of the total number of mares and stallions which contribute genetically to the next generation. Ne, reflects the number of individuals that are contributing to the maintenance of genetic diversity (reviewed in NAS 2013); this number can be difficult to measure directly but is related to the numbers of breeding males and females in a herd. If a herd consists of 20 breeding mares and 30 breeding stallions, then a simplified calculation of Ne (Hartl and Clark 2007) would lead to an estimate of $\widehat{N}e$=48. However, actual Ne is usually lower than the numbers of breeding animals present would imply, so the BLM Wild Horse and Burro Handbook suggests considering other options for maintaining genetic diversity when herd size must be held at below about 150 animals due to habitat limitations or other considerations (USDI BLM 2010). The handbook (USDI BLM 2010) includes suggestions that can be considered for maintaining genetic diversity in small herds such as these HMAs; these suggestions do not represent a specific, legally-binding, BLM policy. One suggestion is to introduce at least 1-2 mares from other similar HMAs every 10 years. A population with an age structure involving high numbers of relatively immature animals (less than 5 years of age) will have a lower value of Ne than a similar sized population with a larger component of breeding-age animals (greater than 5 years of age). Retention of older breeding animals to treat some mares with fertility control but also maintain a 50:50 sex ratio is expected to lead to a higher Ne than a gate-cut, removal only strategy (Gross 2000). Through implementation of the BLM selective removal policy, wild horses 5 to 10 years of age would be the priority for release back to the range. Most or all wild horses under six years of age would be removed, resulting in a potential increase to the Ne in the HMA, compared to a hypothetical scenario where primarily older animals are removed. The Black Mountain and Hardtrigger HMAs genetic diversity was analyzed most recently in 2011 (Cothran 2011). These reports found that genetic variability of the herds in general are on the high side but that there was a high percentage of allelic diversity at risk of loss, due to drift; those alleles were not unique to these herds – they are present in other wild herds and domestic breeds. The report recommended that observed heterozygosity levels at that time were enough that no action was needed at that time but the herds should be monitored closely due to the high proportion of rare alleles The report recommended that if there is a loss of population size there would be a risk to genetic diversity which could be mitigated by the transfer of 1-2 young mares from different herds at least once per generation (10 years), as recommended in the BLM WHB management handbook (2010).

Population Growth Suppression (Fertility Control Treatments)
Implementation of the Proposed Action would lower the overall growth rate for each HMA over

the long term by pairing gathers with population growth suppression in the form of fertility control vaccine treatments for mares. Reduced population growth rates achieved through fertility control treatments would be expected to: extend the time until AMLs are exceeded, increase the intervals between drive trap gathers, and reduce disturbance to individual animals and herd social structure over the foreseeable future. At the herd-level, WinEquus modeling (Appendix I) suggests that average population growth rates under the median trial for the Proposed Action, which includes both gathers and fertility control, would be 2.4 percent (GonaCon) and 4.1 percent (PZP-22). According to the modeling, if follow-up gathers and mare treatments could be implemented on a yearly basis, population growth suppression may be adequate to maintain the population within the existing AML. However, annual gathers are not likely due to funding and staff priorities and complete maintenance of wild horse numbers within AML is not practicable. Therefore, periodic drive trap gathers are anticipated, but not as frequently if fertility treatment and small follow-up gathers are conducted.

Possible physiological, behavioral, and other effects of fertility control vaccine treatment are detailed in Appendix E, are summarized here. At the demographic population level, the expected effects of fertility control vaccine application would be to reduce the growth rate of the herd. This would not necessarily cause a problematic loss of genetic diversity, given the apparent fact that horses in the three HMAs are part of a larger metapopulation (Cothran 2004, NAS 2013), and the BLM has the potential to introduce animals from other HMAs to each of the herds. In terms of genetic diversity loss attributable to fertility control vaccine use, vaccine use should reduce the average number of foals per mare but would not necessarily prevent treated mares from giving birth to some number of foals over the course of their lifetime, either before treatment causes long-lasting infertility, or at some point after the immunological effects of treatment have worn off. At the individual level, fertility control vaccines are expected to cause an immune response that leads to reduced fertility. Other potential effects on treated mares are detailed in Appendix E. Fertility control vaccines are expected to have limited duration of effects unless multiple doses are given to the same animal. For example, if a mare receives four or more doses of ZonaStat-H PZP vaccine, she may become infertile for many years (Nunez et al. 2018). The specific number of doses required to cause long-term infertility depends on the type of fertility control vaccine that is administered. Mares that do not receive enough vaccine doses to stay infertile typically return to fertility as the immune response to the vaccine wears off. Because treated mares may have higher survival and live longer lives, the age structure of the population may come to include more older mares and the generation time of potentially breeding mares could increase. One net effect of a longer generation time can be to increase genetic effective population size (i.e., Gross 2000). It is not expected that these herds would lose genetic diversity and have observed heterozygosity drop below the threshold of concern (USDI BLM 2010) during the 10-year duration of the Proposed Alternative. However, if there are substantial decreases in observed heterozygosity that result from smaller overall population sizes and fertility control vaccine use, ongoing monitoring of genetic diversity would allow BLM to detect those and introduce new animals from other HMAs as needed to maintain an observed heterozygosity at levels that should prevent undue risks of inbreeding.

Alternative C: Gather and Removal without Fertility Control

Gather methods associated with Alternative C are described in Common to Alternative B. Alternative C would not involve fertility control either during gathers or remote darting. Mares would not undergo the additional stress of receiving fertility control injections or freeze-marking and would foal at normal rates until the next gather is conducted. Over the long term more horses would need to be gathered more frequently and placed in off range facilities because there would be no implementation of fertility control vaccines to slow population growth. As a result, AML would be exceeded in a shorter period of time. All other aspects of the wild horse gathers, and

associated impacts would generally be the same as those described for Alternative B.

Cumulative Effects

Past and present action effects are described within Section 3.1.1. Gathers of wild horses have occurred 15 times in the HMAs in the past 20 years. Repeated gathers in the same areas or conducted too frequently, can affect wild horse behavior making them harder to capture. Livestock grazing can impact wild horses by reducing the quantity and quality of forage. In addition, competition of forage in the future is expected to be less due to livestock grazing permit renewals in the area and the expectation that if land use plan objectives and the Idaho Standards for Rangeland Health are not met, changes would be made to livestock grazing to ensure progress towards meeting them. The increased presence and noise associated with motorized recreation could increase disruption of normal grazing and social behavior of the horses. Increased recreation would be expected to result in an increase in livestock control devices (gates, cattle guards, fences) to be left open or damaged, resulting in wild horses and livestock escaping from the HMA. Overall, cumulative effects from past, present, and foreseeable future actions are minimal and not expected to result in any meaningful disturbance to wild horses that remain on the range.

Vegetation

Affected Environment

3.3.1.3 Upland Vegetation

- *What would be the effects of the alternatives on upland vegetation community composition?*

Plant communities within the HMAs are influenced by elevation, soil type, and disturbance history (such as wildfire and grazing). Low elevations (<4,000ft) are typified by big sagebrush (*Artemisia tridentata ssp. wyomingensis, A. tridentata ssp. tridentata*) and or saltbush species (*Atriplex canescens, A. confertifolia*), with an understory of primarily cheatgrass (*Bromus tectorum*) and Sandberg bluegrass (*Poa secunda*) on loamy, fine textured soils. Deep-rooted perennial grass species in these pastures are a minor component and include squirreltail (*Elymus elymoides*), ricegrass (*Achnatherum hymenoides*) and bluebunch wheatgrass (*Pseudoroegneria spicata*). Large swaths of these low elevation areas are dominated by invasive annual grasses such as cheatgrass, North African grass (*Ventenata dubia),* and medusahead (*Tainatherum caput-medusae*). Generally, these areas are devoid of or have minimal native forb species; various species of buckwheat (*Eriogonum sp.),* milkvetch (*Astragalus sp.*), and yarrow (*Achillea millefolium*) do exist with less frequency. Special status plant species do occur primarily in unique soil features across the landscape. Some non-native forb species such as storksbill (*Erodium cicutarium*) and spring draba (*Draba verna*) occur in limited quantities, mostly isolated around range improvements and roadways. These conditions are typical of low elevations of the Black Mountain HMA, and the majority of Hardtrigger HMA.

Higher elevations (>4,000 ft) are comprised of a mix of sagebrush species (*Artemisia arbuscula, A. tridentata ssp tridentata*, and *ssp vaseyana*) with some bitterbrush *(Purshia tridentata*) communities. Deep rooted, cool season bunch grass (e.g. bluebunch wheatgrass, ricegrass, etc.) abundance is more variable (generally higher) in these areas, with a lesser component of invasive annual grasses. There is also greater forb diversity and abundance, including lupines *(Lupinus sp*), penstemon (*Penstemon sp),* paintbrushes *(Castilleja sp*), and balsamroot (*Balsamhoriza sagittata).* Soil textures tend to be coarser, with greater gravel/rock content, including surface gravels which armor the uppermost layer. These conditions are typical of higher elevations of Black Mountain HMA and the majority of Sands Basin HMA.

The 2015 Soda Fire burned nearly 280,000 acres in southwest Idaho and southeast Oregon, including nearly 200,000 acres of sage-grouse habitat, portions of 41 grazing allotments, three wild horse management areas, and a popular motorized and non-motorized recreation area. Across all three HMAs post-fire stabilization and rehabilitation treatments were implemented in the beginning in the fall and winter of 2015 and included aerial shrub and forb seedings, shrub seedling planting, aerial and drill grass seedings, and herbicide applications (USDI BLM 2015a). Many areas received multiple treatments, often overlapping. Additional details regarding vegetation treatments and monitoring data are contained in the 2016 through 2020 Soda ESR Monitoring Reports (USDI BLM 2016 – 2020), which are available for review upon request.

Environmental Consequences

3.3.1.4 Assumptions for Analysis

Impacts to vegetation from grazing result from the removal or damage of vegetation by foraging animals and subsequent alterations in plant community composition and structure. Utilization is defined as "the proportion or degree of current year's forage that is consumed or destroyed by animals" (USDI BLM 1999). Generally, the vigor of grass species can be maintained with slight (6 – 20 percent), light (21 – 40 percent) or moderate (41 – 60 percent) utilization during the growing season. Wild horses can graze closer to the ground than domestic cattle, yielding heavy (> 60 percent) utilization (Scasta et al 2016, USDI BLM 1999). Heavy utilization reduces photosynthetic tissue below levels needed to maintain root reserves, diminishing the vigor of utilized species. Utilization during growth periods when reserves and photosynthesis are limited (for initial growth, regrowth, or seed formation) impacts herbaceous species more than utilization during periods when the plant is not re-growing or producing seeds. To address these impacts, limiting the intensity of grazing use of bluebunch wheatgrass during the active growing season and periodic deferment or yearlong rest is suggested (Stoddart 1946; Blaisdell & Pechanec 1949; Mueggler, 1972; Miller et al 1994; Brewer et al. 2007).

Repeated use during the growing season limits the ability of plants to recover sufficiently, placing them at an ecological disadvantage, in which less palatable species optimize on sunlight, water and soil nutrients (Caldwell 1981, Burkhardt and Sanders 2012, Miller et al 1994). This in turn causes community shifts to those dominated by early successional species, such as squirreltail and Sandberg bluegrass. Furthermore, Sandberg bluegrass is palatable for a shorter period than other perennial species, placing grazing pressure on more palatable species. Reduced vigor in deep rooted bunchgrass species and dominance of shallow-rooted species, limits water availability for other species, which further reduces capability for species diversity (i.e. forbs). Additionally, horses tend to congregate in foraging areas which can compact soil leading to loss/erosion (Kaweck et al 2018). This in turn reduces seed germination/recruitment due to soil impermeability. Unlike authorized livestock which graze on a determined schedule with supplemental management (e.g. strategic water placement, salting, herding, etc.), horses move freely across the landscape making these impacts difficult to mitigate/rectify (Davies and Boyd 2019). Because of this unfettered movement, cheatgrass and other invasive annual grasses can also be more widely distributed in fecal matter (King et al 2019).

Although perennial grasses are preferred forage for wild horses, shrubs are important during the fall and winter when grasses are dormant, and in drought years when perennial grasses are less/unavailable. Excessive browse of shrubs weakens individual plants, leading to greater decadence and mortality, further perpetuating community shifts to those which are dominated by shallow-rooted perennials species and invasive annual grasses due to reduce water

capture/infiltration. Areas where horses graze have been noted to have a lower abundance of cover grasses, lower shrub cover, lower total vegetative cover, lower species richness, and less continuous shrub canopy (Beever and Herrick 2006).

Due to hoof action and vehicle use around trap sites, upland vegetation would be trampled within an approximately one-acre area. Previously disturbed areas would be used for trap locations, thus minimizing new disturbance. Disturbed areas are anticipated to increase in non-native, potentially noxious species which would be managed through integrated pest management (IPM) (USDI BLM 2016). Furthermore, these areas are more susceptible to soil loss from lack of supporting vegetation for site stability, and compaction from vehicles and horse movement at the trap site.

3.3.1.5 Alternative A – No Action

The No-Action Alternative would have no direct gathering effects, and no effects specific to horse trap locations; horse populations in each HMA would continue increasing at ~18 percent annually. The Black Mountain and Sands Basin HMAs are above high AML (Table 1) and Hardtrigger HMA would be above high AML within 2 years (Table 10 Appendix I). As a result of increased horse numbers above AML, bands of horses would concentrate in higher numbers or reduce seasonal movement throughout the HMAs because of occupancy by other bands, increasing grazing pressure in more confined areas.

Increased horse numbers in the HMAs would increase the demand for forage, which would result in heavy utilization of perennial bunchgrasses, including heavy use during the growing season, favoring shallow rooted Sandberg bluegrass. This would lead to decreased water capture for other species (e.g. deep-rooted native grasses and forbs) and lead to increased abundance of invasive annual grasses. Annual grass communities lack the root occupancy in the soil profile to adequately capture water and increase herbaceous litter, often leading to overland flow events. Annual grass communities, as compared to the potential and capability of native perennial communities, lack the ability to protect the soil surface from raindrop impact; do not provide detention of overland flow; and do not provide maintenance of infiltration and permeability, and protect the soil surface from erosion (Pellant et al. 2005).

High utilization of perennial grasses would also lead to continued resource degradation and the targeting of shrubs as desirable forage depletes (Boyd et al 2017). The overall weakening of native perennial plants would result in increases in non-native species. Vegetation communities would shift to sprouting shrub dominated (e.g. rabbitbrush) with minimal perennial understory or invasive annual grass dominated. Further soil compaction, especially within the Hardtrigger HMA, which contains the finest textured soil, would exacerbate soil loss, and lack of vegetative recruitment further degrading the landscape. Post fire recovery efforts for the 2015 Soda fire would be damaged, resulting in either re-treatment breaching an ecological threshold where treatment is no longer effective (Chambers 2014) These community shifts are anticipated to occur long-term (4+ years). However, with an estimated 18 percent annual increase, community shifts, in particular to one that is invasive annual grass dominant could occur more rapidly due to increased forage demands and trampling/congregation.

It is expected that the HMAs would not meet land use plan objectives ORMP OBJ SOIL 1, 2, VEGE 1, SSPS 1 due to unsatisfactory watershed health and impaired vegetative conditions.

3.3.1.6 Alternative B – Proposed Action

Gather activities would result in some localized disturbances to upland vegetation where the horses

are driven into the corral traps. These include damage to vegetation from wild horse trampling at gather sites, holding locations, crushing by vehicles, temporary corrals, and holding facilities. Impacts associated with trap sites are anticipated to be minimal. These sites have been previously disturbed, and impacts associated with gather activities would be a continuation of current use. Vegetative impacts are not expected to extend past the immediate trap locations, generally limited to approximately 0.25 acre per site. Generally, one or two trap sites would be utilized per gather with approximately 0.5 acres of disturbance per HMA per gather. Because these are limited to previously disturbed areas, new disturbance would be limited.

Long-term effects of achieving and maintaining the established AMLs would lead to sustainable use of rangelands by wild horses. Upland vegetation would be allowed to recover sufficiently between use periods, leading to increased seed set and proliferation. Increased grass abundance would also increase water capture for other species (e.g. forbs, shrubs) communities in uplands by reducing the grazing pressure (utilization). Reducing the wild horse population to within AML would lessen grazing and trampling impacts and allow plants to continue photosynthetic processes to initiate regrowth for recovery and grow adequately for reproduction. This is especially relevant for deep-rooted perennial species which capture water and stabilize soils leading to increased colonization of other native, desirable species.

Reduced population growth rates through removal and fertility treatments would keep horse populations within AML ranges for a longer period and reduce gather frequency long term. This would allow continued and increased environmental improvements such as increased abundance of deep-rooted perennial grasses, and overall vegetative diversity within the HMAs.

It is expected that the HMAs would meet land use plan objectives ORMP OBJ SOIL 1 and 2, VEGE 1, and SSPS 1 due to improved watershed health and vegetative conditions.

3.3.1.7 Alternative C – No Fertility Treatment

Impacts associated with gather activities would be the same as described in Alternative B. Wild horses in the HMAs would reproduce at normal rates (approximately18 percent), reaching the high AML range (Table 1) in each HMA in less time, resulting in more frequent gathers when compared to Alternative B. Due to normal reproduction rates, impacts to vegetation would be similar to Alternative A, due to insufficient recovery time between high AML years soliciting additional gathers.

It is expected that the HMAs would not meet land use plan objectives ORMP OBJ SOIL 1, 2, VEGE 1, SSPS 1 due to unsatisfactory watershed health and impaired vegetative conditions.

Cumulative Effects

Cumulative effects of the wild horse management alternatives on vegetation are considered in the context of other activities and natural processes and are described below. The cumulative impact analysis area (CIAA) for vegetation is all surface acreage within the HMAs because it is not expected that impacts would extend beyond these boundaries (Appendix A, Map 1). Past, present, and reasonably foreseeable future actions outside these boundaries would have little direct or indirect impact on vegetation resources in the allotment. Plants, rooted in the soil, are not transient over long distances, apart from wind-distributed seeds. Indirect effects of actions affecting soil and vegetation are spatially confined to a short distance from the action. The timeframe considers activities from past actions which have influenced current conditions, activities planned within the

next three years, and the term of the herd management plan. Upon expiration of the herd management plan, resources would be reassessed and evaluated for wild horse impacts.

Past, Present, and Reasonably Foreseeable Future Actions
Past and present actions within the HMAs include off highway-vehicle (OHV) use which have impacted soil and vegetation resources within discrete locations. Continued livestock grazing across land management ownerships would continue impact conditions across the CIAA in pursuit of attaining Idaho Standards for Rangeland Health (USDI BLM 1997).

3.3.1.8 Alternatives A and C

Current and historic livestock grazing is the primary activity contributing to the cumulative impacts that this alternative would have on upland vegetation communities in the CIAA. Since 2000, the HMAs have been gathered five times due to emergency (drought or fire) eight times due to exceedance of AML and twice in a capture, treat, release (CTR). This pattern is expected to continue and contribute to unacceptable vegetation conditions when combined with primarily livestock grazing, making less forage available for all species and overall habitat degradation.
Upland vegetation in the CIAA would decline due to unfettered wild horse population growth. When these consequences are combined with the past, present, and reasonably foreseeable future actions that have impacted upland resources within the CIAA, vegetation and soil resources that are currently not meeting relevant ORMP management objectives would not have the opportunity to improve unsatisfactory conditions.

3.3.1.9 Alternative B
Livestock grazing has predetermined livestock number and season of use which would be maintained/modified in compliance with Idaho Standards for Rangeland Health in conjunction with appropriate AML in each HMA. When these consequences are combined with the past, present, and reasonably foreseeable future actions that have impacted vegetation resources within the CIAA, conditions would meet ORMP management objectives.

3.4 Wetlands/Riparian Zone and Water Quality

- *What would be the effects of the alternatives on riparian habitat and water quality?*

<u>*Wetlands/Riparian Zone*</u>
Three watersheds are affected by activities within the Hardtrigger and Black Mountain HMAs: Hardtrigger Creek-Snake River, Reynolds Creek, and Rabbit Creek-Snake River. There are approximately 34.2 miles of perennial streams (lotic systems) located throughout the two HMAs. Reynolds and Rabbit Creeks are the primary perennial streams in the Black Mountain HMA. Perennial streams in the Hardtrigger HMA include Hardtrigger, Little Hardtrigger, Macks, Reynolds, Salmon, and S***w Creeks. In addition, there are numerous intermittent and ephemeral drainages throughout the HMAs. The majority of drainages are spatially oriented southwest to northeast and ultimately drain into the Snake River.

The Hardtrigger and Black Mountain HMAs have numerous springs, meadows, and seeps (lentic systems) that are mostly located in the upper elevations (>4,000 feet). Many springs have been developed and have small exclosures surrounding the springheads. Hardtrigger HMA has approximately 50 springs and Black Mountain HMA has 10 springs (USDI 2010), many of which have been developed and have small exclosures (0.1 to 1 acre) surrounding the springheads.

Riparian vegetation communities in the HMAs are generally comprised of woody vegetation including various willows *(Salix sp.),* cottonwood *(Populus sp.),* and a diversity of other shrubs, with interspersed codominant or dominant herbaceous communities consisting of various rushes *(Juncus sp.),* sedges *(Carex sp.),* and grasses (*Poaceae*). Woody riparian vegetation tends to occur in upper elevation areas while herbaceous riparian vegetation can occur throughout lotic and lentic areas.

Riparian resources within the Sands Basin HMA include Jump Creek drainage containing one wet meadow complex within that drainage, and one spring in Pasture 4. Jump Creek is a perennial stream with intermittent segments within the Middle Snake River-Jump Creek watershed (HUC - 1705010308). Approximately 2.5 miles of Jump Creek out of a total of 6.8 miles are on public lands that flow through the Sands Basin HMA. The Jump Creek section in Pasture 2 (approximately one mile) is a wet meadow complex with a low gradient meandering channel. The stream channel migrated sometime in the recent past (40 years), leaving a broad wet meadow complex. The entire channel is heavily vegetated with cattails (*Typha sp*.). The wet meadow section of the channel is predominately vegetated with Baltic rush (*Juncus arcticus*)*,* Nebraska sedge (*Carex nebrascensis*)*,* Beaked sedge (*Carex rostrata*)*,* American bulrush (*Schoenoplectus americanus*), Kentucky blue grass (*Poa pratensis*), and salt grass (*Distichlis spicata*). Riparian woody vegetation is not known to occur within this system. The spring in pasture four, known as the Sands Basin Wet Meadow Complex, supports herbaceous riparian vegetation including Nebraska sedge, cattails, and various mesic forbs.

Water Quality

Streams with designated beneficial uses are addressed under the Idaho Administrative Procedures Act (IDAPA) 16.01.02. Waters are designated as impaired when there is a violation of water quality criteria and are placed on the §303(d) list. Idaho's 2010 Intergraded Report (2011) and associated ArcGIS data were used to identify current water quality designations and status.

All streams within the Black Mountain and Hardtrigger HMAs have general use designations for secondary contact recreation, agricultural water supply, wildlife habitat, and aesthetics. Additional designated beneficial water uses in Reynolds Creek include primary contact recreation, cold water biota, and salmonid spawning. Approximately 76% (104 miles) of the stream miles (both perennial and intermittent) are fully meeting their designated beneficial uses and 24% (33 miles) are not supporting their beneficial uses in the Hardtrigger HMA. In Black Mountain HMA, approximately 17% (16 miles) of the stream miles are fully meeting their beneficial uses, 80% (75 miles) have not been assessed, and 3% (3 miles) are not supporting their beneficial uses.

Within the Sands Basin HMA, Jump Creek has a general use designation for secondary contact recreation, agricultural water supply, wildlife habitat, and aesthetics. Additionally, the State of Idaho assigned cold water biota and primary contact recreation beneficial uses to Jump Creek from its source to its confluence with the Snake River (IDEQ, 2004). Jump Creek from its headwaters to the Snake River is listed on the State of Idaho's 303(d) water quality limited stream segments due to habitat alteration.

No specific water quality parameters have been taken on this segment of Jump Creek. However, data from modified MIM data taken in 2008 indicated that the lower section of Jump Creek (pasture 2) appeared to have adequate vegetation and streambank stability to protect the water quality. On the upper reaches of Jump Creek in pasture 4, 2008 MIM data indicated decreased bank stability and low median stubble height. Both parameters indicate decreased streambank protection from high flows, and higher likelihood of increased sedimentation, turbidity, and water temperatures.

Environmental Consequences

3.4.1.1 Assumptions for Analysis

Riparian areas occupy a small but unique position on the landscape within the HMAs. Riparian areas are important to water quality, water quantity, and forage. Riparian sites provide habitat needs for many species and support greater numbers and diversity of wildlife than any other habitat type in the arid West. Presently, wild horse use of these areas is readily evident, including trampling and trailing and excessive utilization. A decline in the quantity and diversity of stabilizing vegetation along 43 lotic riparian areas indicates these perennial waterways are at risk of increased bank erosion and sedimentation. Unmanaged horse use increases the risk of soil erosion in both riparian and upland plant communities (Davies et al. 2014, Boyd et al. 2017) and can decrease ecosystem productivity and function. Analysis assumption for uplands are also applicable to riparian areas but are exacerbated by extended use outside of the growing season, and increased congregation during the summer months and or drought. Kaweck et al (2018) concluded that "…wild horses caused more streambank disturbance than did livestock or wildlife. For vegetation stubble height a horse had 1.4 times greater effect compared with a cow occurrence." Similarly, the biomass indicator showed that a wild horses had about "…3 times greater impact on biomass than a cow occurrence," and that, "Riparian management is difficult in areas with wild horses because these animals generally have year-long access to riparian areas, and levels of use or population levels are difficult to restrict" (Kaweck et al. 2018).

3.4.1.2 Alternative A – No Action

Wetlands/Riparian Zones

Yearlong use by an increasing population of wild horse population would increase utilization in riparian areas, preventing root reserves from developing in riparian vegetation to a level that would permit reproduction of the few surviving native hydric species in streams (USDI BLM, 2006). The excessive use would continue to jeopardize the functioning condition of these streams and would likely result in decreased functioning conditions of streams within all three HMAs, over both the short and long-terms (<3 years and >10 years, respectively). Riparian impacts would become increasingly evident with annual increases in wild horse numbers and year-long use.

Short-term impacts including streambank and spring damage due to hoof action and riparian vegetation composition changes to less desirable species would occur. Stream segments that are near well-traveled roads would not have the severity of impacts due to occasional human disturbance, but impacts would increase as horse numbers increase. Long-term impacts would increase due to the increased wild horse numbers. Stream channel and vegetation damage due to increased trampling and more intensive grazing use over prolonged periods (>10 years) would soon reach untenable levels, prompting episodes of channel down cutting and bank caving.

Soil erosion and plant health would continue to be most greatly affected around water locations, and to a lesser extent away from water sources. If wild horses are left unmanaged, damage to riparian areas may occur due to potential destruction of vegetation along streambanks. Erosion would increase and contribute to downstream sediment and salinity issues. Watershed health throughout the area would continue to decrease, resulting in increased sediment and salinity delivery into local and regional drainages.

Water Quality

Damage to streambanks due to yearlong utilization and hoof action from wild horses above AML would cause continued degradation of riparian zones. These impacts would increase

sedimentation, turbidity, and water temperature. Long-term impacts would be an overall decline in water quality due to streambank trampling and riparian vegetation composition change to less desirable species due to excessive horse numbers. Overall, Idaho water quality standards would not be attained in the short or long-terms.

3.4.1.3 Alternative B – Proposed Action

Wetlands/Riparian Zones
Bait traps would be set near typical horse water locations. The gathering of horses near riparian areas has the potential to result in short-term, localized effects such as sedimentation, siltation, and bank alterations as a result of riparian areas/wetlands being traversed by horses. The effects of wild horses crossing riparian areas/wetlands during gathers are not anticipated to be discernible from the number of crossings horses would make if gathers were not occurring because the horses cross the streams in the HMAs regularly.

Maintaining wild horse numbers within AMLs would be expected to promote more seasonality in grazing use patterns by horses and allow livestock management prescriptions designed to enhance riparian and channel conditions to operate as intended. Grazing use patterns that are more seasonal, of shorter duration, and of reduced intensity would improve riparian and channel systems. Over the long term, the riparian vegetation would develop and expand, slowing water flows and catching sediment, and eventually narrowing and deepening stream channels.

Lower population density would be expected to lead to reduced competition among wild horses using the accessible water sources and less damage to the riparian vegetation and resources.

Water Quality
Suspended sediments may increase briefly in short sections of streams below crossings during gathering. With limited damage (1-2 crossings), water quality would be adversely affected for a short period (days) and limited distance downstream (<0.25 mile). Water quality standards for sediment and temperature would be expected to improve or be attained over the long term (>10 years) where riparian and channel conditions would improve due to wild horse populations being within AML. Improvements in riparian and hydrologic conditions would stabilize streambanks and reduce sediment levels. Shade from overhanging streambanks, riparian vegetation, and deeper stream channels would promote cooler stream temperatures.

3.4.1.4 Alternative C – No Fertility Treatment

Wetlands/Riparian Zones
Impacts associated with gather activities would be similar to those described in the Alternative B (3.3.1.14) but more frequent. Fertility treatments slow reproduction, and therefore population growth. Benefits from gathers would be for a shorter duration without fertility control treatments. With out fertility treatments, wild horses in the HMAs would reproduce at normal rates (~18 percent), reaching the high AML range in each HMA in a shorter period. This would result in the need for more frequent gathers due to increased population growth rates with no fertility treatments. AML levels in each HMA would be exceeded in a much shorter period, resulting in increased use on upland and riparian vegetation. The spatial and temporal extent of the gather operations relative to riparian and upland resources would be the same under this alternative as Alternative B.

Water Quality

Impacts associated with gather activities would be similar to the impacts described in Alternative B; however, the impacts would be more frequent as horse gathers would be performed at shorter intervals to maintain AML without the use of fertility treatments. Additionally, herds would reach AML more quickly without fertility treatments and be at higher numbers for cumulatively more time than in Alternative B. Long term effects on water quality of higher horse numbers for longer periods of time are similar to the impacts described in Alternative A.

Cumulative Effects

Riparian areas in the CIAA would decline due to unfettered wild horse population growth. Proliferation of unauthorized OHV routes has been responsible for loss of vegetation, stream channel degradation, and accelerated soil erosion. Although travel management planning and enforcement has reduced this proliferation, effects to riparian areas from OHV travel in stream channels and through springs continues to occur.

Wildfires have indirectly affected riparian areas. Lower elevation wildfires have result in upland vegetation shifts to invasive annual grass dominated which leads to excessive runoff and overland flow events, increasing deposition in riparian areas. Such events also contribute to stream erosion. When these consequences are combined with the past, present, and reasonably foreseeable future actions that have impacted upland resources within the CIAA, vegetation and soil resources that are currently not meeting relevant ORMP management objectives would not have the opportunity to improve unsatisfactory conditions.

3.5 Livestock Management

- *What would be the effects of the alternatives on livestock grazing management and associated ranch operations?*

Affected Environment

The rangeland management program includes twelve grazing allotments within the HMAs currently under deferred or rest rotation grazing systems with use periods of spring, summer, fall and winter (Table 5). Due to the nature of deferred and rest rotation systems there is variability in the number of livestock, season of use, and AUMs per pasture. Across the HMAs allotments are partially within the HMAs, resulting in some pastures not included (see Table 5).

Grazing from cattle, wild horses, and wildlife when out of balance with the ecosystem can result in the deterioration of resources (refer to Vegetation, section 3.3.1.4 for detailed analysis on the impacts of cattle and wild horse use on the vegetation within the HMAs). In these HMAs, water for livestock and wild horses is available from springs and reservoirs during late winter to early summer. Throughout the summer, spring flow and reservoir storage diminish. By the late part of the grazing season water resources diminish causing increases in use and around perennial riparian areas.

Livestock are permitted to trail across portions of the allotments within the HMAs year-round to facilitate the movement of cattle to and from allotments in conjunction with permitted seasons of use (SOU) on the allotment, please refer to Table 5 for a detailed list of SOU across the HMAs. Trailing is a short duration activity with the majority of routes authorizing trailing activities for a day or 2 with 7 days currently the most permitted. Overnighting locations on BLM have been analyzed and incorporated on trailing permits as needed.

Table 5. Mandatory Terms and Conditions for Grazing Permits by HMA

HMA	Allotment	Livestock Numbers (Cattle)*	Season of Use	Active AUMs
Black Mountain	East Reynolds (0651)	754	04/05 – 06/30	1,981
	Rabbit Cr./Peters Gulch (0517)	450	05/01 – 08/08 11/01 – 02/28	2,193
	Hardtrigger (0516)	218	04/01 – 11/30	1,560
	Reynolds Creek (0508)	1,001	03/15 – 02/28	3,874
Hardtrigger	Wildcat (0522)	5,568	04/01 – 12/31	1,097
	Shares Basin (0556)	800	04/01 – 11/30	2,838
	Hardtrigger (0516)	218	04/01 – 11/30	1,560
	Reynolds Creek (0508)	1,001	03/15 – 02/28	3,874
	Elephant Butte (0513)	189	03/15 – 05/31 11/01 – 2/28	637
	Bass FFR (0620)	45	12/1 – 12/31	46
	Chipmunk FFR (0523)	115	3/1 – 2/28	72
Sands Basin	Sands Basin (00521)	600	04/01 – 06/05	558
	Strodes Basin (0519)	679	3/15 -5/31 11/15 – 12/31	1,978
	Juniper Springs (0525)	190	3/1 – 11/30	1,715

*Maximum livestock numbers on the allotment at a point in time as outlined in the Mandatory Terms and Conditions of the grazing permits on the allotment. Numbers may be spread out across multiple pastures and/or nuances in season of use.

Table 6. Summary of Allotments within HMAs

HMA	Allotment	Acres w/in HMA and Percent (percent) of HMA
Black Mountain	East Reynolds (0651)	19,602 (38.9)
Black Mountain	Rabbit Cr./Peters Gulch (0517)	25,117 (49.89)
Black Mountain	Hardtrigger (0516)	3,908 (7.76)
Black Mountain	Reynolds Creek (0508)*	1,804 (3.58)
Hardtrigger	Wildcat (0522)	5,538 (8.37)
Hardtrigger	Shares Basin (0556)*	5,039 (7.6)
Hardtrigger	Hardtrigger (0516)	19,264 (29)
Hardtrigger	Reynolds Creek (0508)	35700 (53.9)
Hardtrigger	Elephant Butte (0513)*	452 (.68)
Hardtrigger	Bass FFR (0620)*	22 (.03)
Hardtrigger	Chipmunk Field FFR(0523)*	13.7 (.02)
Sands Basin	Sands Basin (00521)	11,623 (99)
Sands Basin	Strodes Basin (0519)*	93.5 (.79)
Sands Basin	Juniper Springs (0525)*	19.5 (.16)

*Updated GIS data shows these allotments are within the HMA previously unknown at the time of the ORMP (1999).

Environmental Consequences

3.5.1.1 Alternative A – No Action

Increased horse numbers would result in increased grazing pressure for water and forage across the HMAs. Increases in pressure could result in utilization rates that would exceed the capacity of the area, providing the opportunity for degradation to occur. Post disturbance the vegetation community shifts becoming increasingly susceptible to invasion of undesirable species. As the vegetation community shifts to a post disturbance state, increased grazing pressure would perpetuate competition for desirable forage between livestock and wild horses. The decline in resource conditions would continue to deteriorate as forage for all rangeland users becomes scarce (see Vegetation Section 3.3.15 for detailed analysis of impacts to vegetation). To some level or at some degree, if utilization levels became high enough, livestock grazing could be reduced or may not have enough forage to sustain current levels authorized on the grazing permits.

3.5.1.2 Alternatives B and C

Livestock located near gather activities would be temporarily disturbed or displaced by the traps and the increased vehicle traffic during the gather operation. The BLM would work with livestock operators to set up traps at locations in the allotment that livestock are not currently utilizing. Livestock may be moved to different pastures to avoid trapping operations. Typically livestock would move back into the area once gather operations cease. During wild horse gather activities gates between allotments would be opened to facilitate movement of wild horses to capture sites, livestock could move to other areas and or allotments during this time. Additional burdens to the livestock operators may include being asked to ensure their cattle are out of the gather area.

Impacts from humans and horses at trap locations to livestock would be slight, localized per trap site, and only for a short time (see section 2.2.1, Gather Activity for the potential length of each gather activity).

Livestock trailing could occur while horses are being gathered. Livestock trailing during gather activities could result in similar disturbances of livestock loss and mixing as herds could be spooked during trailing activities resulting in cattle remaining on the allotment or in the area until they can be found by the permittee. To prevent disruption of trailing, permittees would be contacted and informed as far in advance of known gather dates as possible.

Maintaining wild horse numbers within AMLs would reduce overall grazing pressure. Utilization levels within the HMA are assumed to remain consistent with current management levels for all users assuming climatic variability and no changes in management. Overlap between wild horses and livestock use is assumed to be limited, resulting in balanced use across the HMAs.

Cumulative Effects

Livestock grazing will be managed in accordance with applicable laws, regulations, and policies, including the regulatory requirement that livestock grazing be managed to meet, or make significant progress towards meeting, the Idaho Standards for Rangeland Health. Changes to the permitted livestock use, including AUMs and season of use, on pastures in the HMA would be evaluated during the permit renewal process. Overall, cumulative impacts would not be expected to livestock grazing from the Proposed Action and alternatives when added with past, present, and foreseeable future actions.

3.6 Wildlife and Fisheries

- *What would be the effects of horse population levels and aerial and bait gather activities on migratory birds and greater sage-grouse?*
- *What would be the effects of horse population levels and aerial and bait gather activities on big game species (bighorn sheep, mule deer, and pronghorn antelope)?*
- *What would be the effects of the alternatives on fish, including special status species?*

Affected Environment

The HMAs are located within the Owyhee Uplands and Canyons and Unwooded Alkali Foothills Level IV Ecoregions of Idaho (McGrath et al. 2002). Within the HMAs, these ecoregions are characterized by rolling shrub steppe uplands interrupted by low hills, rocky outcrops, and sandy alkaline deposits. Perennial streams are rare and much less common than in other Ecoregions in the OFO. Wildlife habitats within the HMAs include juniper woodlands, sagebrush steppe, salt desert shrub, grassland meadows, riparian areas, and seeps and springs. Upland and riparian vegetation within the HMAs have been discussed in detail in Sections 3.3 and 3.4.

Migratory Birds and Greater Sage-Grouse

The majority of migratory bird species in the HMAs are associated with shrub steppe, grassland or riparian habitats, the same habitats as sage-grouse. Migratory birds and sage-grouse depend on the availability of forage and nesting habitat. The habitats available within the affected area include upland and salt desert shrub as well as riparian communities. Disturbance effects to sage-grouse habitat has similar consequences to migratory bird species on the HMAs.

Sage-grouse are dependent on sagebrush throughout the year, for both food and cover. In the winter, they need areas where sagebrush can be found growing above snow. In the nesting season, they need sagebrush for cover and food, grasses for nesting cover, and forbs for food and nesting cover. In late summer and fall, as the vegetation dries, they use riparian areas, springs, moist meadows, and higher elevations where they can find green forbs to eat. The presence of wild horses

is associated with a reduced degree of greater sage-grouse lekking behavior (Muñoz et al. 2020). Moreover, increasing densities of wild horses, measured as a percentage above AML, are associated with decreasing greater sage-grouse population sizes, measured by lek counts (Coates et al. 2021).

The BLM has specific management guidance for sage-grouse in the ARMPA (USDI BLM 2015b). The OFO occurs within the West Owyhee Conservation Area and the three HMAs occur in mapped Important Habitat Management Area for sage-grouse. However, following ARMPA adaptive management guidelines, all Important Habitat Management Areas in the conservation area are currently managed as Priority Habitat Management Areas due to the fact the areas have tripped the ARMPA adaptive management hard triggers for habitat and population.

Winter and spring seasonal habitat for sage-grouse occurs across most of the three HMAs, at elevations generally above 3,000 ft. Summer seasonal habitat occurs at higher elevations in each HMA at elevations generally above 4,000 ft, as birds pursue succulent vegetation and water during hot and dry summer months. Five occupied sage-grouse leks occur within the Hardtrigger HMA and one occupied lek occurs within the Black Mountain HMA. Two other occupied leks occur within two miles from an HMA boundary (ARMPA 2-mile lek buffer for behavioral disturbance to leks).

Big Game

The three HMAs support populations of bighorn sheep, mule deer and pronghorn antelope.
Both mule deer and pronghorn use portions of the area yearlong. Mule deer are common in the uplands and canyonlands within the HMAs, while pronghorn use areas of open grassland and low shrubs.

Bighorn sheep habitat occurs across Sands Basin and Hardtrigger HMAs and the upper half (higher elevation) of Blacks Mountain HMA. Mapped lambing habitat occurs within the Blacks Mountain HMA. Bighorn sheep typically occur in canyonland and open areas where rugged topography is readily accessible. They forage on a variety of grasses, forbs, and shrubs throughout the year. Breeding occurs in the fall and lambs are born April to mid-June. Bighorn sheep tend to form small groups for increased vigilance that a herd provides. During the fall breeding period, young bighorn rams are known to disperse throughout potential habitat in search of breeding opportunities.

Redband Trout

Within the affected area, redband trout (*Oncorhynchus mykiss gairdneri*), a BLM sensitive species, have been documented in Jump, Reynolds, Salmon, and Macks Creek. This trout is the resident form of steelhead trout that historically returned from the ocean to spawn in streams throughout the Owyhee River watershed.

The Hardtrigger HMA has several perennial and intermittent lotic systems that support redband trout including but not limited to 2.35 miles of Mack's Creek and 6.21 miles of Salmon Creek. Reynolds Creek, 5.3 miles of which forms the boundary between the Hardtrigger and Black's Mountain HMAs is also known to support redband trout. The Sands Basin HMA contains one main lotic system, 5.79 miles of Jump Creek, which is known to contain redband trout on a seasonal basis during high flows when fish move into the HMA to spawn during spring runoff.

Environmental Consequences

3.6.1.1 Alternative A – No Action

The No-Action Alternative would have no direct gathering effects, and no effects specific to horse trap locations. Without gathers, the wild horse population within the HMAs would continue to grow at ~18 percent annual growth rate and would exceed AML. When populations exceed AML, resource conditions degrade.

Winter range is considered the limiting factor for both wild horses and big game in the HMA; therefore, AML is based on forage availability during the winter months. When the combined use of big game, wild horses, and livestock exceed the sustainable capacity of the landscape to provide winter habitat, resource conditions would be expected to decline. Over utilization would result in decreased forage availability and resource damage. Under the No Action Alternative, there would be no short-term disturbance associated with gathers, but failing to manage the number of horses in the HMA would eventually result in deteriorating habitat quality and lack of sufficient resources to support livestock, horses, wintering big game and migratory birds. Increasing wild horse populations can reduce grass and forb cover below sage-grouse habitat objectives established in the ARMPA.

Migratory Birds and Greater Sage-Grouse

Direct and indirect effects to migratory birds would be the same as described here for sage-grouse. High populations of wild horses would be expected to adversely impact sage-grouse and their habitat. Wild horse numbers on the HMAs would increase, which would have negative indirect effects to vegetation in sage-grouse habitat over the long-term (>5 years). Increased horse numbers, above the AML, would increase the demand for forage on the plant communities, which would result in heavy (>50 percent) utilization of perennial bunchgrasses, including heavy use during the critical growing period (spring and early summer for most plant species). This would reduce the perennial grass and forb understory required for sage-grouse to successfully nest and rear their broods.

This predicted over-utilization, especially as riparian areas desiccate in late summer, would eventually lead to continued resource degradation. Utilization would shift from herbaceous to woody vegetation, which would reduce the shrub height and sagebrush canopy cover required for sage-grouse to successfully nest and rear their broods. The overall reduction of native perennial plants would result in increases in invasive and noxious weeds, which would further reduce the quality of sage-grouse habitat within the affected area.

Big Game Species

High populations of wild horses would be expected to adversely impact big game species and their habitat over the long-term (>5 years). The effects of wild horse populations being over high AML would increase the demand for forage on the plant communities, which would result in heavy (>50 percent) utilization of perennial bunchgrasses, including heavy use during the critical growing period (spring and early summer for most plant species). Utilization of herbaceous and woody vegetation exceeding 40 percent could result in competition between horses and big game species. Competition between wild horses and big game species in riparian habitat during the summer and early fall months can result in negative impacts to animal fitness, productivity, and restrict forage quantity and quality (Loft 1991). Riparian areas are extremely important for deer and pronghorn foraging in the fall, and as fawning and calving habitat in the spring.

In general, wild horse grazing is a competitive action with other herbivores that reduces available forage and reduces cover and habitat structure needed by smaller herbivores (Medin and Clary 1989, Schulz and Leininger 1990, Hayward et al. 1997). Effects of wild horse grazing on big game

under the No Action alternative could include reduced amounts of forage (e.g., grasses, forbs), browse (e.g., willows, sagebrush, and bitterbrush), and protective cover. These effects could lead to lower winter survival due to a reduction of high-quality forage that bighorn sheep, deer and antelope require in order to build up winter fat reserves. A reduction in cover could expose fawns to greater predation and increase mortality rates.

Redband Trout
Yearlong use by wild horse populations above AML would increase trampling and grazing of riparian vegetation within the HMAs. Riparian vegetation would have both reduced vigor and recruitment. As described in section 3.4.1.3, the loss of stabilizing riparian vegetation coupled with increased hoof action on streambanks would lead to erosion and increase turbidity within riparian systems. The loss of riparian vegetation would also reduce shading and result in increased water temperature. As discussed in section 3.3.1.5, heavy utilization of upland vegetation (i.e., perennial bunchgrasses) would lead to soil loss during overland flow events and increased sedimentation in riparian systems. These conditions would result in reduced survivorship and reproduction of redband trout.

3.6.1.2 Alternative B – Proposed Action
The primary impacts to wildlife in the Proposed Action would occur from gather activities over the short-term (2-4 years). Maintaining herd numbers within AMLs would result in benefits in the long- and short-term to wildlife and fisheries through improvements in habitat conditions, the maintenance of healthy wetland/riparian zones, and the reduction of competition for forage between wildlife and wild horses.

Fertility control in the form of injections while in captivity would have no direct impact on wildlife in the HMA. Remote darting could cause negligible displacement. Long-term beneficial effects would result from a longer period between disturbances associated with gather activities, as reproduction would be delayed in the treated horses. Fertility control would result in less frequent disturbance in the HMA over the long term compared to no fertility control. Overall, the Proposed Action would have negligible effects to wildlife over the short term but would benefit habitat long-term compared to the No Action Alternative.

Migratory Birds and Greater Sage-Grouse
Impacts to migratory birds that are present during the gather would be the same as those described for sage-grouse. Trap locations and staging areas would be selected with avoidance to presence of raptor nests, burrowing owls, and wetland/riparian zones. All gather activities occurring during the sage-grouse lekking season would follow applicable required design features in the ARMPA. Trap sites and staging areas would be located at least 0.25 miles from any occupied lek and gather activities within two miles of an occupied lek would occur between 9:00 am and 6:00 pm to avoid disturbance to lekking birds.

Helicopter activity would cause low to moderate disturbances over the short term (1 hour to several days) for sage-grouse occupying habitat within the HMAs. Because wild horses could be dispersed throughout the HMAs, sage-grouse would be exposed to single or multiple disturbances during the gather activities. Localized displacement of individuals could occur as wild horses are moved to trap sites, however sage-grouse would have adequate time to react to the presence of horses and mortality would not be expected from wild horse-sage-grouse collisions. Increased human activity would cause sage- grouse to avoid trap sites until traps are removed. Sage-grouse would be expected to return to normal behavior and habitat use within days of the cessation of gather

activities and removal of traps. Drive trap gather restrictions during the foaling season (March 1 – June 30) would limit disturbance to outside the breeding/nesting seasons for migratory birds and sage-grouse.

Sage-grouse would experience slight losses of breeding and foraging habitat where trap sites/staging areas damage or kill shrubs or result in increases in invasive and noxious weeds. Damage to shrubs would reduce nest habitat for shrub obligate birds until those areas recover. Impacts would be limited and short-term as it would affect relatively small areas within 0.25 miles around trap sites. Direct effects to sagebrush habitat on a landscape scale would be minute.

Fertility control measures would result in delayed reproduction in treated horses, which would require less frequent gather activities to manage wild horse populations at AML. Long-term beneficial effects of managing populations at AML would also mean healthier shrub and grass communities to support sage-grouse habitat. This would mean less disturbance in the HMA over the long term compared to no fertility control.

Big Game Species

Impacts to big game species that are present during the gather would be similar for each species. Drive trap gather restrictions during the foaling season (March 1 – June 30) would limit disturbance to bighorn sheep lambing (April 15 – June 15) and deer and pronghorn fawning season (May 1 – June 30).

Helicopter activity would cause low to moderate disturbances over the short term (1 hour to several days) to big game species occupying habitat within the HMAs. Direct impacts would include elevated heart rates, movement to or use of other habitats, or other irregular behaviors (Bleich et al. 1990, USDI 1994). Because wild horses could be dispersed throughout the HMAs, big game would be exposed to single or multiple disturbances during the gather activities. Big game would be expected to return to normal behavior and habitat use within days of the cessation of gather activities and removal of traps. Disturbances would occur during a period when big game species are mating and building reserves for the winter; however, disturbance events would be short in duration and animals would be expected to recover from slight adverse impacts to physiological condition. Use of helicopters for previous gathers and wildlife surveys (e.g., mule deer, bighorn sheep, sage-grouse) in the area has not been shown to adversely affect long-term survival of those species.

Big game are habituated to the presence of wild horses in the area; however, localized displacement of individuals could occur as wild horses are moved to trap sites. Big game would have adequate time to react to the presence of horses; therefore, mortality would not be expected from wild horse-big game collisions. Increased human activity would cause big game species to avoid trap sites until traps are removed.

If a gathering event were to take place between November 15 and April 30 in an area where big game are concentrated, there could potentially be some stress to those species. It is assumed that once the big game species realize that they are not the object of the herding or hazing efforts of the helicopter that they would cease their avoidance behavior and wait for the helicopter to pass. The ramifications of this stress as a result of short-term exertion is difficult to quantify and would depend upon the duration, snow depth, temperature, terrain, and condition of the animals. Given this scenario, the impacts to wintering big game during an average winter should be minimal.

While short-term disturbances could occur to big game on winter range primarily as a result of

aerial gathering activities, the proposed action would meet the intent of SO 3362, which recommends site-specific management activities to conserve or restore big game habitat (BLM IB-2019-005). The Order specifically directs field offices to revise wild horse and burro AMLs if necessary and to remove horses and burros exceeding established AMLs from winter range or migration corridors if habitat is degraded as a result of their presence. The Order also recommends limiting disturbance of big game on winter range and supports BLM Idaho statewide guidelines (BLM IB-ID-2021-003) for preventing disturbance to big game on winter range.

Management to keep the wild horse population at or below the AML for the HMA would have negative short-term direct effects (1-2 weeks) of disturbance that are minimized through timing restrictions for gather activities, but would maintain habitat for big game over the long-term in the HMA,

Redband Trout
The effects of wild horses crossing riparian areas/wetlands during gathers are not anticipated to be discernible from the number of crossings horses would make if gathers were not occurring because the horses cross the streams in the HMAs regularly. Water traps in the Black Mountain and Hardtrigger HMA's are at established troughs or stock ponds with exclosures built around natural water sources. Because of this, impacts to redband trout would be negligible.

Under this alternative, two water traps would be placed in the vicinity of Jump Creek. Due to the temporal restrictions on trapping horses during foaling season, the proposed action would occur after the critical growth period of riparian vegetation and when the affected area of Jump Creek is seasonally dry and soils more stable. These water traps would only be constructed when Jump Creek is dry and no redband trout are present. Additionally, water traps would be checked twice daily during gathers to ensure that impacts to riparian areas are minimal and short-term in nature. The small footprint of disturbance, coupled with the temporal restrictions on gathering means that redband trout would not be significantly affected by the proposed decision. As discussed in 3.4.1.3, maintaining appropriate AML with both fertility control and gathers would benefit riparian areas, and in turn, benefit redband trout as compared to the Alternative A.

3.6.1.3 Alternative C – No Fertility Treatment

The primary impacts to wildlife in Alternative C are similar to those described in Alternative B; short-term behavioral disturbances and localized habitat loss at trap sites/staging areas during gather activities and long-term improvements to wildlife habitat through maintaining wild horse numbers within AMLs to reduce over utilization of forage and resource damages. However, the scale of the short- and long-term impacts differ under Alternative C, with increased negative short-term impacts from more frequent gathers and decreased long-term benefits from those gathers as growing herd numbers reach high AML faster and more often.

Without fertility control for some horses returned to the HMAs, horse numbers would reach or exceed high AML much quicker than with fertility control. To maintain AML management goals, horse gathers would occur more often in Alternative C compared to Alternative B; therefore the short-term negative impacts to wildlife (migratory birds and greater sage-grouse, big game species, and redband trout) would occur more often. Horse herd numbers after a gather would increase faster and be at or above high AML more often in Alternative C compared to Alternative B, but less often when compared to Alternative A; heavily utilization and competition for forage between wildlife and wild horses would occur more quickly between gathers.

The impacts of horse gathers on redband trout under Alternative C are similar to those described in Alternative B. However, not implementing fertility control would necessitate a higher frequency of gathers to maintain appropriate AML; therefore, Alternative C is expected to have more frequent, short-term, indirect impacts to redband trout than compared to Alternative B. Overall impacts, both direct and indirect, to redband trout would be less than those described in Alternative A.

3.6.1.4 Cumulative Effects

Past and present action effects are described within Section 3.1.1. BLM and other agency permitted grazing would be additive in nature to wild horse and big game vegetation utilization. Under Alternative A, with higher population levels of wild horses, competition for forage between wild horses, livestock, and big game would be greatest; while competition for forage would be least under Alternative B with the use of horse gathers in conjunction with fertility control. Limited forage availability and vegetative cover would degrade habitat for big game, migratory birds, and sage-grouse.

The 2015 Soda Wildfire burned much of the three HMAs and in most areas perennial grasses have returned but shrub cover is still lacking. In addition, The Soda Fire Fuel Breaks includes areas along some roadways within the HMAs with long-term management goals of low vegetation (<12 inches). These vegetation changes would be additive to the limited short-term vegetation disturbances at trap sites and result in more areas of wildlife habitat degradation until the vegetation recovers. Alternative C, with more frequent gather activities, would have the largest direct habitat disturbances.

Recreation use within the area is highest in late winter/spring. Recreation can cause behavioral responses in wildlife, similar to disturbances from wild horse gathers, causing animals to flee/flush/retreat. Disturbance to wildlife from recreation would be additive and greatest under Alternative C with more frequent gather activities.

4 Consultation and Coordination and List of Preparers

4.1 Tribal Consultation

The Shoshone-Paiute Tribes were consulted during formal Government-to-Government consultation, on August 18, 2022. Comments during this consultation were in support of the need to manage wild horse populations with in the HMAs.

4.2 List of Preparers

Name	Title
Lonnie Huter	Planning and Environmental Coordinator
Raul Trevino	Wild Horse and Burro
Tanis Partee	Archaeology
Jessa Davis	Botany
LeeAnn Pallett	Rangeland Management Specialist
Colleen Trese	Wildlife
Michael Bishop	GIS
Marcela Means	Ecologist (Riparian)

5 References Cited

American Association of Equine Practitioners (AAEP). 2011. Bureau of Land Management; BLM Task Force Report.

Ashley, M.C., and D.W. Holcomb. 2001. Effect of stress induced by gathers and removals on reproductive success of feral horses. Wildlife Society Bulletin 29: 248-254.

Beever, E.A. and J.E. Herrick. 2006. Effects of feral horses in Great Basin landscapes on soils and ants: direct and indirect mechanisms. Journal of Arid Environments 66:96-112.

Blaisdell, J. B., & Pechanec, J. F. 1949. Effects of herbage removal at various dates on vigor of bluebunch wheatgrass and arrowleaf balsamroot. Ecology, 298-305.

Bleich, V. C., R. T. Bowyer, A. M. Pauli, R. L. Vernoy, and R. W. Anthes. 1990. Responses of mountain sheep to helicopter surveys. Calif. Fish and Game 76:197-204.

Boyce, P.N., and P.D. McLoughlin. 2021. Ecological interactions involving feral horses and predators: review with implications for biodiversity conservation. Journal of Wildlife Management. DOI: 10.1002/jwmg.21995

Boyd, C.S., K.W. Davies, and G.H. Collins. 2017. Impacts of feral horse use on herbaceous riparian vegetation within a sagebrush steppe ecosystem. Rangeland Ecology and Management 70:411-417.

Brewer, T. K., Mosley, J. C., Lucas, D. E., & Schmidt, L. R. 2007. Bluebunch Wheatgrass Response to Spring Defoliation on Foothill Rangeland. Rangeland Ecology and Management, 60(5), 498-507.

Burkhardt, J., & Sanders, K. 2010. Management of Growing Season Grazing in the Sagebrush Steppe. Owyhee Science Review Program.

Burkhardt, J.W. and Sanders, K. 2012. Management of Growing-Season Grazing in the Sagebrush Steppe: A Science Review of Management Tools Appropriate for Managing Early-Growing Season Grazing. Society for Range Management, 34, 30-35.

Caldwell, M. M., Richards, J. H., Johnson, D. A., Nowak, R. S., & Dzurec, R. S. (1981). Coping with herbivory: photosynthetic capacity and resource allocation in two semiarid Agropyron bunchgrasses. *Oecologia*, *50*(1), 14-24.

Chambers, J. P. 2014. Using Resistance and Resilience Concepts to Reduce Impacts of Invasive Annual Grasses and Altered Fire Regimes on the Sagebrush Ecosystem and Greater Sage-grouse: A Strategic Multi-Scale Approach. Fort Collins: United States Department of Agriculture, Forest Service, Rocky Mountain Research Station.

Coates, P.S., O'Neil, S.T., Muñoz, D.A., Dwight, I.A., and Tull, J.C. 2021. Sage-grouse population dynamics are adversely impacted by overabundant free-roaming horses. The Journal of Wildlife Management 85:1132-1149.

Collins G.H., S.L. Petersen, C.A. Carr, L. Pielstick. 2014. Testing VHF/GPS Collar Design and Safety in the Study of Free-Roaming Horses. PLoS ONE 9(9): e103189. doi:10.1371/journal.pone.0103189.

Cothran, E.G. 2004. Genetic analysis of the 4-mile, Sands Basin, Black Mountain, and Hard Trigger, ID feral horse herds. Report from the University of Kentucky Department of Veterinary Sciences to the BLM. June 14, 2004.

Cothran, E.G. 2011 Genetic Analysis of the Black Mountain HMA, ID. Department of Veterinary Integrative Bioscience Texas A&M University. March 3, 2011

Cothran, E.G. 2011 Genetic Analysis of the Hardtrigger HMA, ID. Department of Veterinary Integrative Bioscience Texas A&M University. March 1, 2011

Davies, K.W., G. Collins, and C.S. Boyd. 2014. Effects of free-roaming horses on semi-arid rangeland ecosystems: an example from the sagebrush steppe. Ecosphere 5:1-14.

Davies, K. W., & Boyd, C. S. (2019). Ecological effects of free-roaming horses in North American rangelands. *BioScience*, *69*(7), 558-565.

DelGiudice, GD & Sampson, Barry & Kuehn, DW & Carstensen, Michelle & Fieberg, John. (2005). Understanding margins of safe capture, chemical immobilization, and handling of free-ranging white-tailed deer. WILDLIFE SOCIETY BULLETIN. 33. 677-687. 10.2193/0091-7648(2005)33[677:UMOSCC]2.0.CO;2.

Eldridge, D. J., Ding, J., & Travers, S. K. (2020). Feral horse activity reduces environmental quality in ecosystems globally. *Biological Conservation*, *241*, 108367.

Folt, B.P., L.S. Ekernas, D.R. Edmunds, M.T. Hannon, and K.S. Schoenecker. 2023. PopEquus: A Predictive Modeling Tool to Support Management Decisions for Free-roaming Horse Populations, Version 1.0.1. USGS Software Release. USGS Fort Collins Science Center, Fort Collins, Colorado. DOI: 10.5066/P9NMRQDG

Government Accountability Office (GAO). 2008. Bureau of Land Management: Effective long-term options needed to manage unadoptable wild horses.

Greene, E.A., C.R. Heleski, S.L. Ralston, and C.L Stull. 2013. Academic assessment of equine welfare during the gather process of the Bureau of Land Management's wild horse and burro program. Journal of Equine Veterinary Science 5: 352-353.

Griffin, P.C., L.S. Ekernas, K.A. Schoenecker, and B.C. Lubow. 2020. Standard operating procedures for wild horse and burro double-observer aerial surveys. U.S. Geological Survey Techniques and Methods, book 2, chap. A16, 76 p. https://doi.org/10.3133/tm2A16.

Gross, J.E. 2000. A dynamic simulation model for evaluating effects of removal and contraception on genetic variation and demography of Pryor Mountain wild horses. Biological Conservation 96:319-330.

Hansen, K.V., and J.C. Mosley. 2000. Effects of roundups on behavior and reproduction of feral horses. Journal of Range Management 53: 479-482.

D.L., and A.G. Clark. 2007. Principles of population genetics. Sinauer Associates, Inc. Sunderland, Massachusetts.

Hayward, Bruce, et al. "Effects of Livestock Grazing on Small Mammals at a Desert Cienaga." *The Journal of Wildlife Management*, vol. 61, no. 1, 1997, pp. 123–29. *JSTOR*,

Idaho Department of Environmental Quality (IDEQ). 2002. Implementation plan for the North and Middle Fork of the Owyhee River. Final implementation plan compiled in association with the Bureau of Land Management, Idaho Department of Lands, Idaho Soil Conservation Commission, and the North and Middle Fork Owyhee Watershed Advisory Group. February 2002.

Kaweck, M. M., Severson, J. P., & Launchbaugh, K. L. (2018). Impacts of wild horses, cattle, and wildlife on riparian areas in Idaho. *Rangelands*, *40*(2), 45-52.

King, S.R., Schoenecker, K.A., & D.J. Manier. 2019. Potential spread of cheatgrass and other invasive species by feral horses in western Colorado. *Rangeland ecology & management*, *72*(4), 706-710.

King, S.R., and K.A. Schoenecker. 2022. Application of tail transmitters for tracking feral horses as an alternative to radio collars. Wildlife Society Bulletin 46(4):e1338

McGrath, C. L., A. J. Woods, J. M. Omernik, S. A. Bryce, M. Edmondson, J. A. Nesser, J. Shelden, R. C. Crawford, J. A. Comstock, and M. D. Plocher. 2002. Ecoregions of Idaho. U.S. Geological Survey, Reston, VA.

Medin, D. E. and Clary, W. P. 1989. Small mammal populations in a grazed and ungrazed riparian habitat in Nevada. Res. Pap. INT U.S. Dep. Agric. For. Serv. Intermt. Res. Stn. Ogden, Utah : The Station. INT-413.

Miller, R. F., Seufert, J. M., & Haferkamp, M. R. 1994. Management of bluebunch wheatgrass (Agropyron spicatum): A review. Station Bulletin 669, Oregon State University, Agricultural Experiment Station, Corvallis, Oregon.

Mueggler, W.F. 1972. Influence of competition on the response of bluebunch wheatgrass to clipping. Journal of Range Management, pp.88-92.

Muñoz, D.A., P.S. Coates, and M.A. Ricca. 2020. Free-roaming horses disrupt greater sage-grouse lekking activity in the great basin. Journal of Arid Environments 184: 104304.

National Park Service (NPS). 2008. Environmental Assessment of Alternatives for Managing the Feral Horses of Assateague Island National Seashore. NPS Assateague Island National Seashore.

National Research Council of the National Academies of Sciences (NAS). 2013. Using science to improve the BLM wild horse and burro program: a way forward. National Academies Press. Washington, DC.

Nuñez, C.M.V. 2018. Consequences of porcine zona pellucida immunocontraception to feral horses. Human-Wildlife Interactions 12:131-142.

Owyhee Air Research. 2022. Results of May 2022 infrared wild horse survey in Owyhee Field Office HMAs. Report to the BLM.

Pellant, M., P.L. Shaver, D.A. Pyke, J.E. Herrick, N. Lepak, G. Riegel, E. Kachergis, B.A. Newingham, D. Toledo, and F.E. Busby. 2020. Interpreting Indicators of Rangeland Health, Version 5. Tech Ref 1734-6. U.S. Department of the Interior, Bureau of Land Management, National Operations Center, Denver, CO.

Ransom, J.I., L Lagos, H. Hrabar, H. Mowrazi, D. Ushkhjargal, and N. Spasskaya. 2016. Wild and feral equid population dynamics. Pages 68-86 in J. I. Ransom and P Kaczensky, eds., Wild equids; ecology, management and conservation. Johns Hopkins University Press, Baltimore, Maryland.

Scasta, J.D., J.L. Beck and C.J. Angwin. 2016. Meta-analysis of diet composition and potential conflict of wild horses with livestock and wild ungulates on western rangelands of North America. Rangeland Ecology & Management.

Scasta, J.D. 2020. Mortality and operational attributes relative to feral horse and burro capture techniques based on publicly available data from 2010-2019. Journal of Equine Veterinary Science, 102893.

Schoenecker, K.S., P.F. Doherty, J.S. Hourt, and J.P. Romero. Testing infrared camera surveys and distance analyses to estimate feral horse abundance in a known population. 2018. Wildlife Society Bulletin 42:452-459.

Schoenecker, K.A., S.R.B. King, and G.H. Collins. 2020. Evaluation of the impacts of radio-marking devices on feral horses and burros in a captive setting. Human-Wildlife Interactions 14:73-86.

Schulz, T., Leininger, W. 1990. Differences in riparian vegetation structure between grazed areas and exclosures. Journal of Range Management. pp. 295-299

Stoddart, L.A. 1946. Some physical and chemical responses of Agropyron spicatum to herbage removal at various seasons.

U.S. Department of Interior (USDI) Bureau of Land Management (BLM) Wildlife responses to helicopter disturbances: A review. 1994. USDI, Bureau of Land Management.

____ 1997. Idaho Standards for Rangeland Health. Boise, Idaho.

____ 1999. Utilization Studies and Residual Measurements – Interagency Technical Reference: 1734-3. Denver, Colorado.

____ 2007. Final Vegetation Treatments Using Herbicides Programmatic Environmental Impact Statement

____ 2010. BLM-4700-1 Wild Horses and Burros Management Handbook. Washington D.C.

____ 2014. State Protocol Agreement between the Idaho State Director of the Bureau of Land Management and the Idaho State Historic Preservation Officer.

____ 2015a. BLM Idaho Post-Fire Recovery Plan, Emergency Stabilization and Burned Area Rehabilitation 2015 Plan: J08B Soda.

____ 2015b. Idaho and Southwestern Montana Greater Sage-Grouse Approved Resource Management Plan Amendment. September 2015.

____ 2016. Soda Fire Monitoring Report. Boise, Idaho.

____ 2017a. Soda Fire Monitoring Report. Boise, Idaho.

____ 2017b. Soda Fire Fuel Breaks Environmental Assessment

____ 2018. Soda Fire Monitoring Report. Boise, Idaho.

____ 2019. Soda Fire Monitoring Report. Boise, Idaho.

____ 2020. Soda Fire Monitoring Report. Boise, Idaho.

____ 2022. Information Bulletin No. ID-2022-011. Update to the Idaho Bureau of Land Management Special Status Animal and Plant Lists.

Winterfeld, Gustav F and Rodger A. Rapp. 2009. Survey of Idaho Fossil Resources, Volume 1: Introduction to the Geologic History of Idaho. Erathem-Vanir Geological Consultants, Pocatello, Idaho. BLM Professional Service Contract No. DLP050083.

6 Appendices

Appendix A. Maps
Appendix B. Issues Considered but Dismissed from Detailed Analysis
Appendix C. Standard Operating Procedures – Fertility Control Treatment
Appendix D. Required Design Features
Appendix E. Literature Reviews on PZP and GonaCon Fertility Control Vaccines, and Wild Horse Ecological Interactions
Appendix F. Land Use Plan Conformance and Other Relevant Laws
Appendix G. ARMPA Conformance Form
Appendix H. Removal Criteria and Treatment and Procedures for Handling Horses After Gather at Off-Range Corrals (ORC)
Appendix I. WinEquus Population Model and Modeling Results
Appendix J. IM2021-002 Comprehensive Animal Welfare Program (CAWP) for Wild Horse and Burro Gathers SOPs
Appendix K IM2022-044 Wild Horse and Burro Gather Planning Scheduling, and Approval
Appendix L IM2022-044 ATT1 1 Selective Removal Criteria